

SCS TRACER ENVIRONMENTAL



ERG Operating Company, LLC Sisquoc Aquifer Exemption Application Cat Canyon Field

Presented to:

ERG Operating Company, LLC



Environmental Services & Regulatory Compliance Division
6155 Old Rig Road
Santa Maria, CA 93454
(805) 937-7216

Presented by:

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August 9, 2013

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EXECUTIVE SUMMARY

ERG Operating Company, LLC (ERG) is requesting an aquifer exemption for the Sisquoc Formation within the administrative limits of the Cat Canyon State Designated Oil Field. The proposed Sisquoc aquifer exemption area includes the Sisquoc Saturated Sands for the purpose of allowing Class II Underground Injection Control (UIC) operations.

This Sisquoc aquifer exemption is requested on the following grounds:

- A) It does not currently serve as a source of drinking water, and
- B) It cannot now and will not in the future serve as a source of drinking water because:
 - 1) It is commercially producing hydrocarbons or is capable of commercially producing hydrocarbons; and
 - 2) It is so contaminated that it would be economically and technologically impractical to render that water fit for human consumption.
- C) The total dissolved solids (TDS) content of the groundwater is more than 3,000 and less than 10,000 milligrams/liter (mg/l) and it is not reasonably expected to supply a public water system.

The following reasons support an aquifer exemption of the Sisquoc Formation in the project area.

- 1) The proposed Sisquoc aquifer exemption area is completely surrounded by oil fields in which all or part of this formation has been exempted based on commercial oil production.
- 2) Geologic and hydrologic continuity exists in the Sisquoc Formation between the proposed aquifer exemption area and the surrounding areas within the State-Designated Oilfield in which the Sisquoc is already exempted aquifer.
- 3) The known domestic or agricultural water wells in the proposed Sisquoc aquifer exemption area are completed in formations overlying the Sisquoc, and are separated from the Sisquoc by the Foxen Formation, a consolidated mudstone.
- 4) Sisquoc groundwater contains high concentrations of total dissolved solids (TDS), chloride, sulfates, and iron.
- 5) Several of the designated beneficial uses of groundwater in the project area are agricultural (AGR), industrial (IND) and residential (RES). However the poor groundwater quality of the Sisquoc groundwater renders it unusable for domestic or agricultural usage because it exceeds California Title 22 secondary drinking water standards for TDS, chloride, iron, boron and sodium concentrations.
- 6) Numerous Sisquoc intervals in the Cat Canyon field contain sub-commercial quantities of petroleum, which adversely affect the potential beneficial uses of this groundwater.



- 7) The proposed Sisquoc aquifer exemption area is located in a remote and sparsely populated area of Santa Barbara County.
- 8) Land in the proposed Sisquoc aquifer exemption area is zoned as agricultural, for which the County allows oilfield operations. The primary use of land in the project area is related to oilfield operations.
- 9) The Sisquoc groundwater has low resource value or beneficial uses except for its use in the petroleum industry for Class II UIC injection operations.



APPLICANT INFORMATION

ERG Operating Company, LLC
6155 Old Rig Road
Santa Maria, CA 93454
Phone (805) 937-7216

EXEMPTION AREA DESCRIPTION

The proposed Sisquoc aquifer exemption area lies on the western side of northern Santa Barbara County (Exhibit 1). The study area consists of about 11.25 square miles and includes the central portion of Cat Canyon (Exhibit 2). The proposed exemption area lies entirely within administrative boundaries of the Cat Canyon field. The following is a description of the proposed Sisquoc aquifer exemption area:

All of Sections 13, 23, 24, 25, 26 and 36 of Township 9 North, Range 33 West of S.B.B.M.

All of Sections 19, 30, and 31 of Township 9 North, Range 32 West of S.B.B.M.

All of the Southwest Quarter of Section 20 of Township 9 North, Range 32 West of S.B.B.M.

All of the West Half of Sections 29 and 32 of Township 9 North, Range 32 West of S.B.B.M.

All of the North Half of Section 1 of Township 8 North, Range 33 West of S.B.B.M.

All of the North Half of Section 6 of Township 8 North, Range 32 West of S.B.B.M.

JUSTIFICATION FOR AQUIFER EXEMPTION

ERG is proposing a Sisquoc aquifer exemption in the project area based on the following reasons (checked if applicable to ERG).

☒ (X) Aquifer is not a source of drinking water and will not serve as a source of drinking water in the future because it:

☒ (X) Has a TDS level above 3,000 and not reasonably expected to serve as a source of drinking water

☒ (X) Is producing or capable to produce hydrocarbons

☐ () Is producing or capable to produce minerals

☐ () Is too deep or too remote

☐ () Is above Class III area subject to subsidence



(X) Is too contaminated (name contaminant(s)): chloride, iron, boron, and sodium

() Other: _____

EXISTING AQUIFER EXEMPTIONS IN PROJECT AREA

Numerous zones within and surrounding the proposed Sisquoc aquifer exemption area are aquifers that have already been exempted based on commercial petroleum production (Exhibit 3; California Department of Conservation, 1991). The Sisquoc Formation is already exempted aquifer in portions of the Cat Canyon field.

Existing aquifer exemptions are listed by the areas located within the boundaries of the Cat Canyon field, in and near the study area, in the following sections. The boundaries of the exempted areas coincide with the oilfield boundaries.

CAT CANYON OIL FIELD

The proposed Sisquoc aquifer exemption area lies entirely within the Cat Canyon field (Exhibit 2). The Cat Canyon field has been divided into seven areas: the Sisquoc Area, the East Area, the Central Area, the West Area, Olivera Canyon Area, the Tinaquaic Area, and the Gato Ridge Area. The following zones have aquifer exemptions based on commercial petroleum production (Exhibit 4):

Sisquoc Area

- S1b Sand and Thomas Sand in the Sisquoc Formation

East Area

- Brooks Sand in the Sisquoc Formation
- Monterey

Central Area

- S6, S6A, and S9 in the Sisquoc Formation

West Area

- S6, S6A, and Alexander Sand in the Sisquoc Formation
- Los Flores Chert in the Monterey Formation

Olivera Canyon Area

- S1b in the Sisquoc Formation
- Cherty, Bentonitic Brown, and Buff & Brown in the Monterey Formation

Tinaquaic Area

- Aenaceous in the Monterey Formation

Gato Ridge Area

- S1b in the Sisquoc Formation
- Monterey

Although the rest of the Sisquoc Formation is not exempt within the Cat Canyon field, it has been used for petroleum production, including enhanced recovery projects, since 1963 to the present day. Exhibit 17 shows the locations of historic and existing wells within the project area; a list of these wells and their years of operation are shown in Exhibit 18.

AQUIFER CHARACTERIZATION

DESCRIPTION OF AQUIFER

The Sisquoc aquifer in the proposed exemption area lies within the Santa Maria Valley Groundwater Basin of the Central Coast Hydrologic Region (Exhibit 5: California Department of Water Resources, 2006). The Santa Maria Valley Basin is drained by the Sisquoc, Cuyama, and Santa Maria Rivers and Orcutt Creek. USDWs are found in alluvium, dune sands, and the Orcutt, Paso Robles, Pismo, and Careaga Formations. Groundwater for use as a USDW is unconfined throughout the proposed aquifer exemption area, primarily in the alluvial deposits and the sands of Orcutt and Careaga Formation. There is no appreciable surface outflow, except during extremely wet years. The proposed Sisquoc aquifer exemption area is located within Detailed Analysis Unit (DAU) No. 071 of the Santa Maria Valley Groundwater Basin (Exhibit 6; California Regional Water Quality Control Board, 2004). Designated beneficial uses are Municipal (MUN); Agricultural (AGR); Industrial Supply (IND); Groundwater Recharge (GWR); Contact Water Recreation (REC1); Non-Contact Water Recreation (REC2); Wildlife Habitat (WILD); Cold Fresh Water Habitat (COLD); Warm Fresh Water Habitat (WARM); Migratory Organism Habitat (MIGR); Rare, Endangered, or Protected Species Habitat (RARE); Fresh Water Replenishment (FRESH); and Commercial or Sport Fishing (COMM).

The Sisquoc Formation can be found throughout the Santa Maria Valley Basin and is composed of marine sediments. The Sisquoc is characterized by loosely consolidated sandstones and diatomaceous mudstone, with some siltstone and conglomerates. Clasts of older rock, such as Opal-CT, quartz chert, and Monterey shale, are not uncommon. The Sisquoc Formation also contains vertebrate and invertebrate fossils.

In the proposed Sisquoc aquifer exemption area, the Sisquoc Formation unconformably overlies the Monterey Formation. It is represented by a coarse-grained shallow-water facies in the Sisquoc River valley, and by a fine-grained deep-water facies in the central and western portions of the Santa Maria River Basin. The deep-water facies attains a maximum thickness of 5,000 feet in the Santa Maria Valley and is composed of massive diatomaceous mudstone with some porcelaneous shale and claystone beds. The shallow-water facies is considerably coarser and

thinner, and is composed of relatively hard beds of siltstone and some conglomerate. The Monterey Formation immediately beneath the Sisquoc is composed of shales and silts containing characteristic marine fossils and shells.

From a hydrogeologic standpoint, the upper Sisquoc formation, above the first oil saturated sands, is considered consolidated rock, relatively impermeable in comparison to the unconsolidated formations which overlay the consolidated Foxen Formation and make up the fresh water bearing formations within the proposed aquifer exemption area. The Sisquoc formation, in addition to being a source rock for hydrocarbons, also acts as a cap rock for the underlying Monterey Formation.

DEPTH OF AQUIFER

The depth to the aquifer is essentially the depth to the top of the Sisquoc Formation, as illustrated in Exhibit 11. In the study area, the average depth to the top of the Sisquoc is 2,000 feet below ground surface, with a maximum of 4,400 feet.

LATERAL EXTENT OF AQUIFER

The Sisquoc aquifer is laterally continuous throughout the study area and the surrounding areas within the Cat Canyon field in which it already is an exempted aquifer. Exhibit 10 is a map of the thickness of the net Saturated Sisquoc Sand, which extends from the top of the saturated sand to the top of the Monterey Formation. The average thickness of the Sisquoc is 1,550 feet with a range of 1,100 feet to 2,650 feet in the area.

DRINKING WATER WELLS IN THE PROJECT AREA

Water well records for the project area were searched using the Department of Water Resources (DWR) and the United States Geological Survey (USGS) databases, as well as ERG's well records.

ERG owns and operates three fresh water wells within the proposed Sisquoc aquifer exemption area. The completion depths for all three wells are shown in Table 1. These wells are producing from the unconsolidated, water-bearing sands above the Foxen Formation. The locations of these wells are shown in Exhibit 12. Water quality analysis results for these wells can be found in Exhibit 13.

Table 1: Privately Operated Water Supply Wells

Well ID	Well Name	Well Name on Map	Lat NAD83	Long NAD83	Static Water Level Depth from Surface (ft)	Total Well Depth from Surface (ft)
08320830	Recruit 5-25	FW5-25	34.834399	-120.30966	not indicated	745
08321005	Recruit 6-25	FW6-25	34.832512	-120.31252	281	470
None	GWP 4	GWP 4	34.503694	-120.18197	191	474

* wells' use is described on pg 10

• PWS wells - may qualify

The DWR and USGS use the water wells located within the project area to monitor ground water levels and water quality. Table 2 shows the completion depths, total depths, and the year of the most recent data collection. The locations of wells in USGS databases are shown in Exhibit 12.

Table 2: USGS Groundwater Level Monitoring Wells

USGS Site Name	Well Name on Map	Lat NAD27	Long NAD27	Static Water Level below Land Surface (ft)	Total Depth below Land Surface (ft)
008N033W01M001S	01M001S	34.79805556	-120.3083333	95	Not Avail.
008N033W03L001S	03L001S	34.79861111	-120.3402778	57	Not Avail.
009N032W29F001S	29F001S	34.83138889	-120.2688889	50.73	Not Avail.
009N032W31F001S	31F001S	34.81666667	-120.2872222	63.19	Not Avail.
009N032W31F002S	31F002S	34.81583333	-120.2866667	68.69	Not Avail.
009N032W31F003S	31F003S	34.81583333	-120.2869444	85.83	Not Avail.
009N032W32K001S	32K001S	34.81111111	-120.2658333	44.75	Not Avail.
009N032W32K002S	32K002S	34.81111111	-120.2675	36.41	Not Avail.
009N032W32L001S	32L001S	34.81083333	-120.2702778	35.2	Not Avail.
009N032W33F001S	33F001S	34.81613888	-120.25225	181	360
009N032W33M001S	33M001S	34.80972222	-120.2575	65	89
009N032W33M002S	33M002S	34.81002778	-120.2584167	61.5	Not Avail.
009N032W33N001S	33N001S	34.80972222	-120.2586111	62.77	Not Avail.
009N033W22L001S	22L001S	34.83980556	-120.3410833	555	590
009N033W23P001S	23P001S	34.83888888	-120.3238889	452.98	Not Avail.
009N033W23R001S	23R001S	34.83777777	-120.3155555	385	Not Avail.
009N033W24L001S	24L001S	34.84	-120.305	202	600

TYPES OF CONSTITUENTS AND TDS IN FORMATION WATER

Sisquoc formation water was characterized based on a review of Division of Oil, Gas, and Geothermal Resources (DOGGR) project files, formation water analyses for producing wells within the study area, and literature on groundwater in the proposed aquifer exemption area. Table 3 summarizes TDS and contaminant concentrations in Sisquoc groundwater collected from existing oil and gas producing wells in the project area. Complete analyses of Sisquoc groundwater are included in Exhibit 14.

Table 3: Sisquoc Groundwater Analysis Summary

CA Title 22 Drinking Water Standards		Recruit 821 Produced Water	Recruit Wastewater Tank	Water Plant Inflow	Steam Generator Feed Water
Primary Standards Constituent	Max. Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)
Barium	1	None Detected	0.68	< 1.0	None Detected
Secondary Standards Constituent	Max. Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)
Chloride	500	1,600	3,100	None Detected	3,700
Iron	0.3	1.1	0.61	1.5	None Detected
pH	8.5 Units	7.9 Units	8 Units	7.5 Units	7.5 Units
Specific Conductance	1,600 Microhos	11,000 Microhos	14,000 Microhos	13,200 Microhos	270 Microhos
Total Dissolved Solids (TDS)	1,000	7,800	10,000	8,500	< 0.5
Other Constituents	Max. Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Measured Contaminant Level (mg/l)	Max. Contaminant Level (mg/l)
Boron	1	21	22	36	36
Sodium	100	2,300	2,200	2,500	2,649.7

TDS concentrations in Sisquoc groundwater range from 7,000 to 10,000 mg/l; a sample from the wastewater being treated in the Water Plant for steam generation on ERG's leases has a TDS of 8,500 mg/l. The Maximum Contaminant Level (MCL) in California's Title 22 Secondary drinking water standards for TDS is exceeded by about 750% for recommended level and about 467% for even short-term limits. Severe restrictions for agricultural use are recommended for TDS concentrations greater than 2,000 mg/l. Although certain intervals are less than the 10,000 mg/l threshold that defines an underground source of drinking water (USDW), Sisquoc formation water is extremely poor quality and unfit for most uses based on the following reasons:

- **High chloride concentrations:** Sisquoc analyses indicate that chloride concentrations range from 1,600 mg/l to 3,700 mg/l. This range of chloride concentrations exceeds the Title 22 MCL by 220% to 640%.
- **High iron concentrations:** Sisquoc produced water analyses indicate that iron concentrations range from 0.61 mg/l to 1.5 mg/l. This range of concentrations exceeds the Title 22 MCL for iron by 103% to 400%.

- **High boron concentrations:** Boron concentrations in waters produced from the Sisquoc Formation range from 21 mg/l to 36 mg/l. This exceeds the Title 22 MCL for boron by 2000% to 3500%.
- **High sodium concentrations:** As indicated in the analyses of produced water from the Sisquoc Formation, sodium concentrations range from 2,200 mg/l to 2,500 mg/l, which exceeds the Title 22 MCL by 2100% to 2400%.
- **Hydrocarbon occurrence:** As indicated in previous portions of this report, the Sisquoc Formation is a current source of commercially produced hydrocarbons. Commercial hydrocarbon production is found both within the boundaries of existing exempted aquifers and outside these exempted aquifers. Exhibit 17 shows the locations of historic and currently producing oil wells within the project area. Exhibit 9 shows historic oil production data for the wells shown in the cross sections (Exhibit 8).

YIELD OF GROUNDWATER

PERMEABILITY

The range of permeability as measured in conventional cores ranges from 1,000 to 5,000 millidarcies. In the medium to coarse grained sandstone the range of permeability is 3,500 to 5,000 millidarcies, while the fine grained mudstone can have a range of permeability of 1,000 to 3,000 millidarcies.

POROSITY

Because of the high concentration of diatoms in the Sisquoc Formation, there is a relatively high porosity in comparison to other consolidated rock formations. The porosity of the Sisquoc sands ranges from 30% to 35%.

SATURATION

Within the Sisquoc Formation, water and hydrocarbons are present. The estimated range of water saturation within the pore space of the Sisquoc is 35% to 45%. The Sisquoc has an estimated oil saturation ranging from 55% to 65% and an estimated range of gas saturation from 0% to 5%. Any groundwater from the Sisquoc would be in such small quantity and such low quality that it could not feasibly serve as a USDW.

OTHER INFORMATION RELATIVE TO AQUIFER

DISTANCE TO EXISTING TOWNS

The proposed Sisquoc aquifer exemption area is located in a remote, unincorporated part of northern Santa Barbara County. The unincorporated town of Sisquoc lies about two miles north of the project area (Exhibit 1). The unincorporated town of Garey is located about four miles

north of the project area. The City of Santa Maria and unincorporated town of Orcutt are about eleven miles west of the project area.

OWNERSHIP AND TYPES OF LAND USE IN PROJECT AREA

Land within the proposed Sisquoc aquifer exemption area has both private and municipal land owners. The proposed Sisquoc aquifer exemption area is zoned as AG-II-100 (Exhibit 19). Growing and harvesting crops as well as breeding and raising animals are allowed in the AG-II-100 zone. The purpose of the AG-II-100 zone is to designate areas suitable for agricultural uses and prevent incompatible uses from encroaching and prematurely converting these lands to non-agricultural usage. Per the Santa Barbara County Land Use and Development Code (LUDC), land zoned as AG-II-100 is designated as suitable for a combination of agricultural, estate-type residential development, and oil field operations.

POPULATION AND WATER USAGE

The proposed Sisquoc aquifer exemption area lies entirely within the boundaries of the Santa Maria Valley Basin. Water usage in the project area is mainly composed of private water wells for domestic and agricultural use. Residents in the town of Sisquoc are supplied water by the Golden State Water Company, which operates water supply wells in the area to supply its customers in Garey and Sisquoc. The town of Sisquoc has a permanent population of about 234 over an area of 2.2 square miles. The town of Garey has a permanent population of about 68 over an area of 1.3 square miles. Annual water use in the town of Sisquoc and the surrounding areas is estimated to be 12.2 million gallons or 111 gallons per capita per day. This includes significant quantities of water used for agricultural operations within the Golden State Water Company's service area (Exhibit 16).

AVAILABILITY OF ALTERNATE SURFACE AND GROUNDWATER SOURCES

The Golden State Water Company serves the towns of Sisquoc and Garey near the proposed Sisquoc aquifer exemption area. Annual water use is about 111 million gallons. Domestic water is provided by supply wells near the towns of Garey and Sisquoc. Residences and agricultural operations outside of the Golden State Water Company service area obtain fresh water from private water wells. Water use information for these wells is unknown, due to private water well information being held as confidential.

AQUIFER INTERCONNECTION WITH SURFACE AND FRESH WATERS

Sisquoc groundwater occurs under confined conditions. Aquifer interconnection between the Sisquoc and surface water is unlikely because there are no bodies of surface water within the proposed aquifer exemption area. Aquifer interconnection between the Sisquoc and existing Underground Sources of Drinking Water (USDW) are unlikely because the overlying,

consolidated Foxen Formation provides geologic separation between the Sisquoc Formation and the base of fresh water in the unconsolidated, Careaga Formation.

INJECTION ACTIVITIES IN PROJECT AREA

HISTORIC INJECTION ACTIVITIES

Since the discovery of petroleum in the early 1900s, the Cat Canyon Field has had oil and gas production. This production, at its peak in 1953, was coincidental with improvements in extraction technology. The petroleum in this field, especially in the Sisquoc Formation, is considerably heavier than the petroleum found in the Monterey Formation. In mid-1960s, several cyclic steam projects were underway in the Cat Canyon Field, including a project by Tidewater Oil Company that was located within the proposed aquifer exemption area. Another project by Getty Oil Company, with cooperation from the Department of Energy, began in 1975. Cyclic steam and steam flood projects in the Cat Canyon Field have remained in the area since, with the level of activity corresponding with the per barrel price of oil. A list of wells that are either currently producing or have historically produced petroleum from the Sisquoc Formation can be found in Exhibit 18.

Historic petroleum production charts are shown in Exhibit 9 for the wells used to create the cross sections in Exhibit 8. The months of zero production shown for the wells shown in Exhibit 9 correspond to periods in which production in the Cat Canyon field was shut in. Heavy oil became economically infeasible to produce when the price of crude oil fell in the mid-1980s. As the per-barrel price of oil has increased to its present day price, it has become economically feasible to return these wells to production.

PROPOSED INJECTION ACTIVITIES

Proposed injection activities would include cyclic steam injection for wells that have previously been steamed and for wells to be drilled in the future as part of ERG's ongoing oilfield operations. The water supply for steam generation includes produced water that has been treated to a TDS of 0 ppm to supply three steam generators. The quality of the treated produced water is presented in Exhibit 15.

CONCLUSIONS

- Hydrocarbons are present in the Sisquoc formation and have been commercially produced since the early 1900s.
- While there are water supply wells located within the proposed Sisquoc aquifer exemption area, they are not completed in the Sisquoc Formation.
- The Sisquoc groundwater has not ever been used as a public water source and no water supply wells are expected to be drilled in the Sisquoc Formation in the future.

- There are no bodies of water in the proposed Sisquoc aquifer exemption area.
- The recognized base of fresh water is above the Foxen Formation, which overlies the Sisquoc Formation and provides geologic separation between the base of fresh water and the Sisquoc.
- TDS concentrations in the Sisquoc groundwater are more than 3,000 mg/l and can range up to 10,000 mg/l in the project area.
- High concentrations of TDS, chloride, iron, boron, and sodium in the Sisquoc groundwater result mainly from naturally-occurring sources.
- Sisquoc groundwater is unfit for municipal or agricultural uses because it has: 1) concentrations of TDS, chloride, iron, boron, and sodium which exceed California Title 22 secondary drinking water standards; and 2) occurrences of petroleum in numerous intervals throughout the project area.

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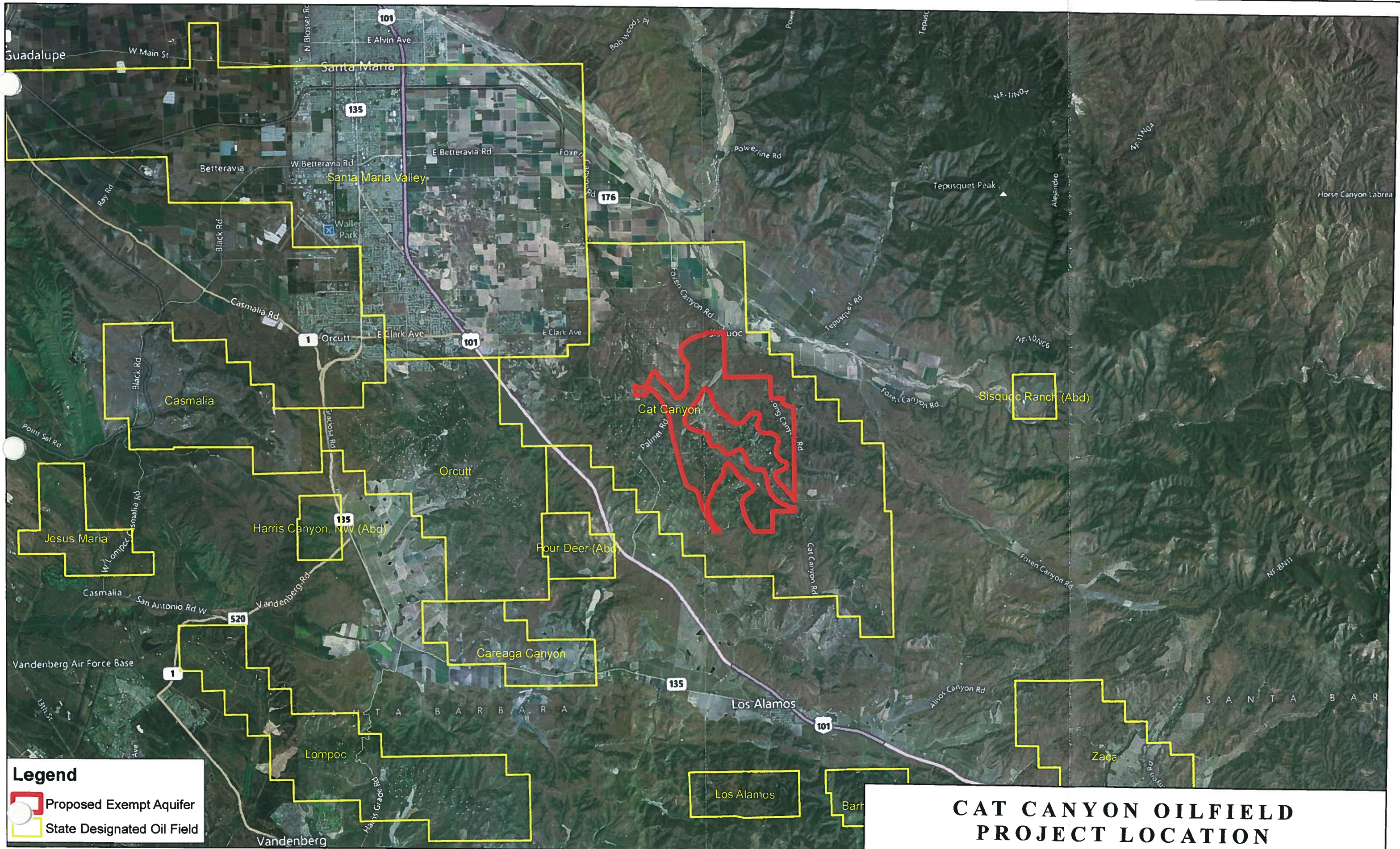
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Exhibit 1
Project Area Map

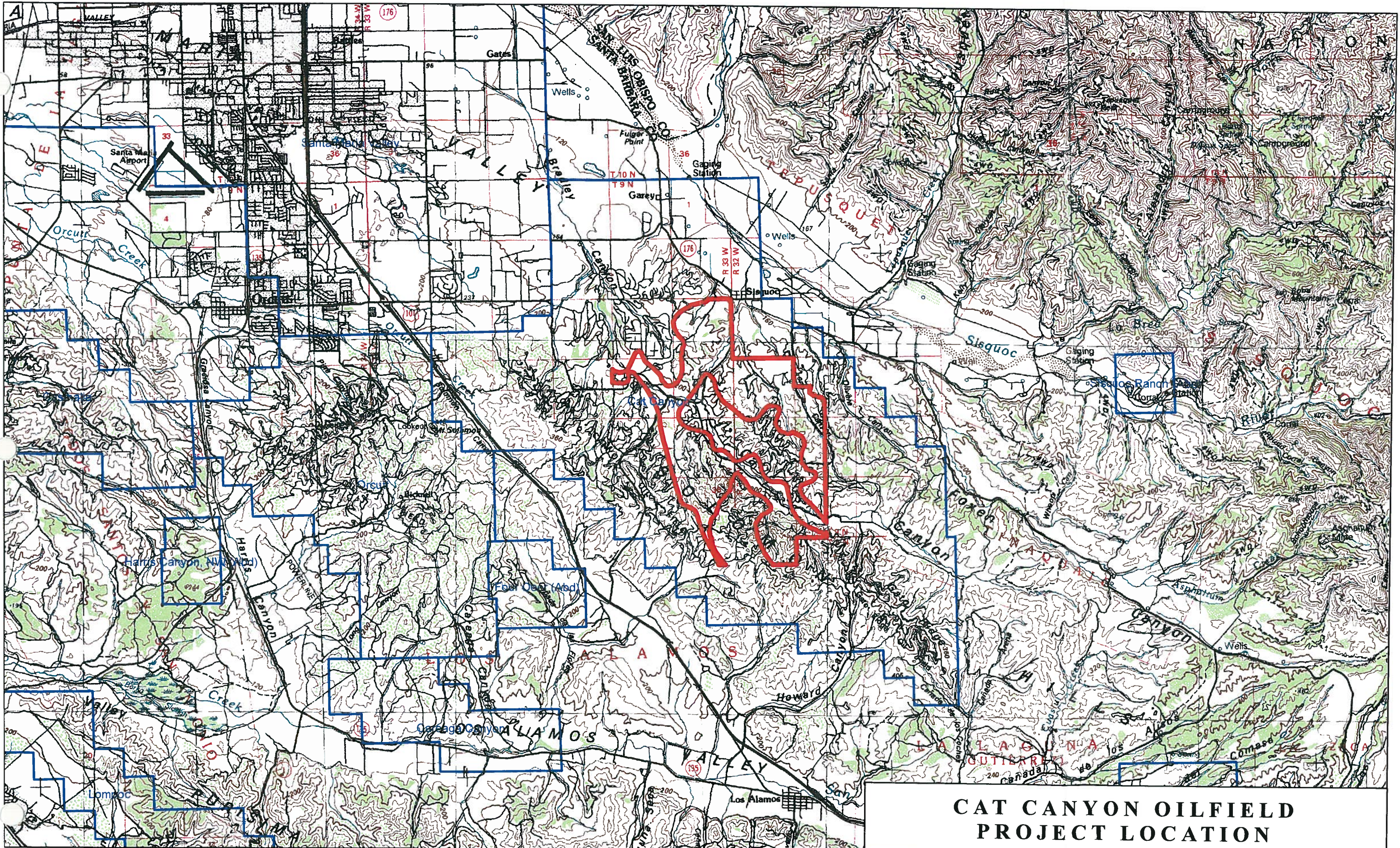


Legend

- Proposed Exempt Aquifer
- State Designated Oil Field



Exhibit 2
Topographic Map



0 0.5 1 2 3 4 5 6 7 8 Miles



ERG OPERATING COMPANY, LLC
CAT CANYON OILFIELD
SANTA BARBARA COUNTY, CALIFORNIA
JUNE 19, 2013

ERG OPERATING COMPANY
CAT CANYON OILFIELD



Exhibit 3

Index of Oil Fields

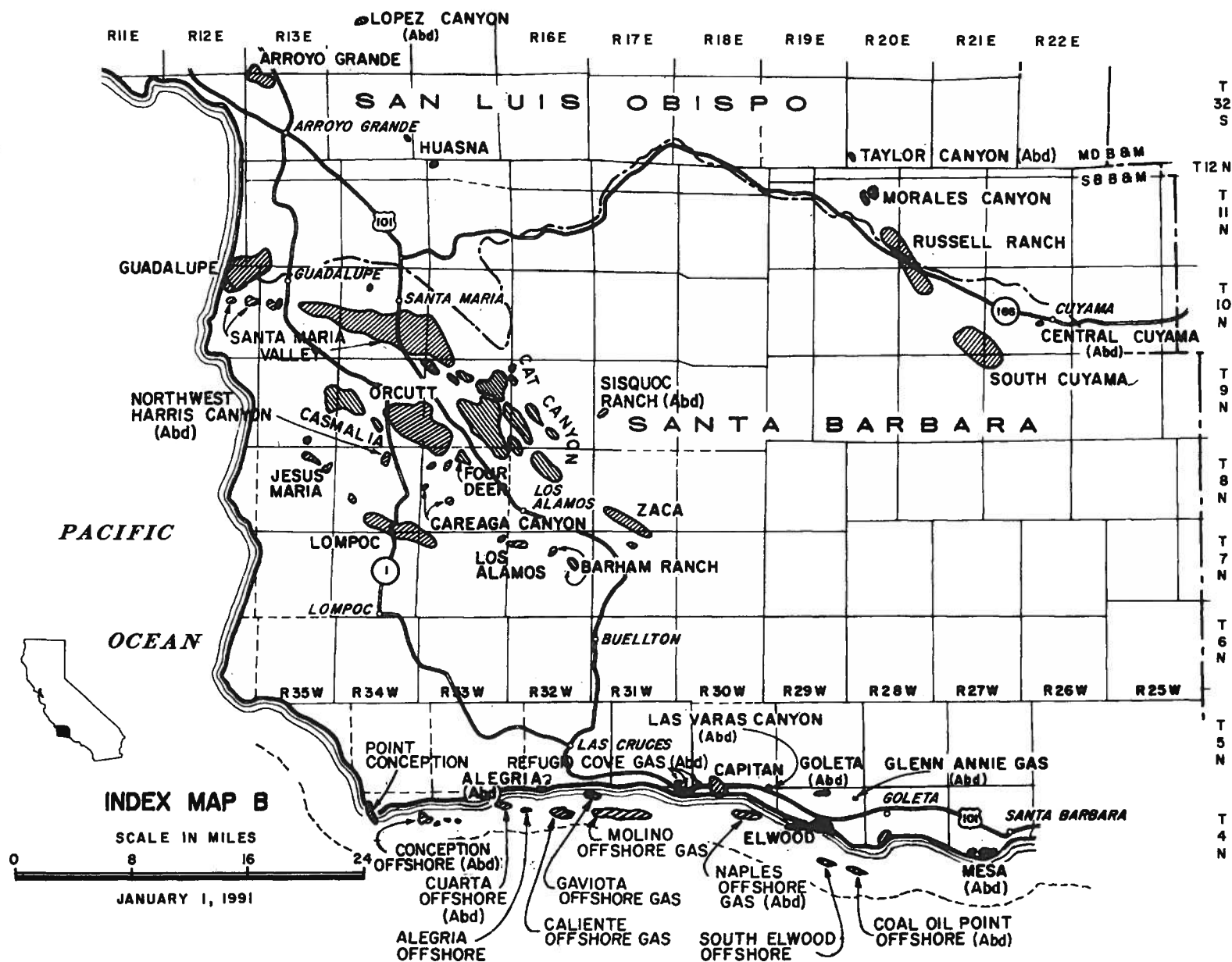
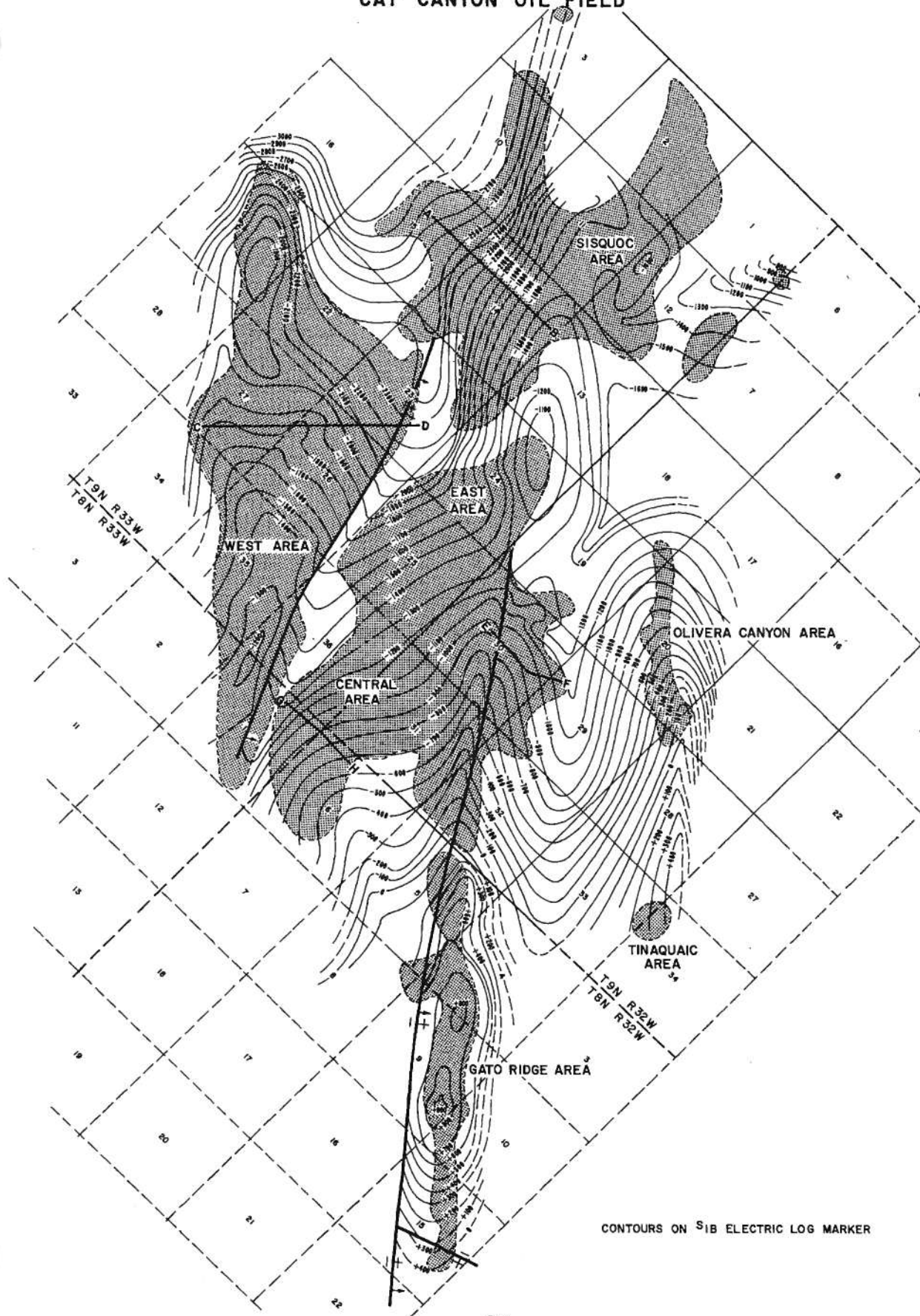




Exhibit 4
Cat Canyon Field – Geologic Data

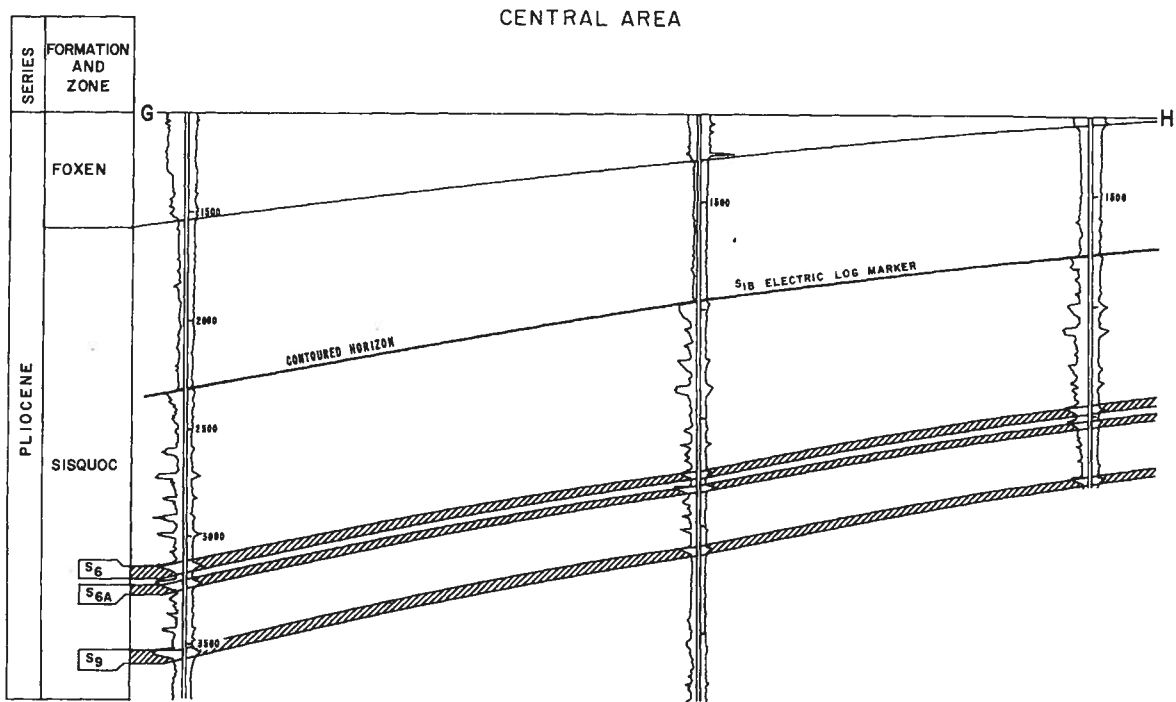
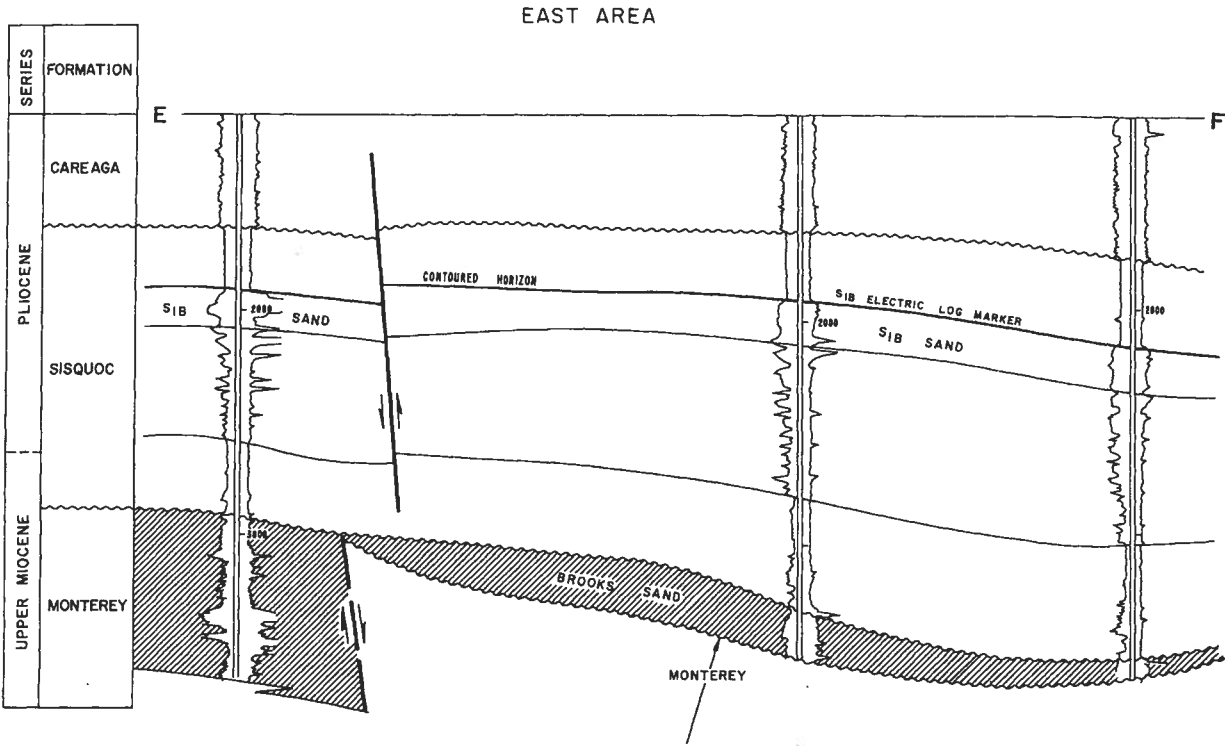
CAT CANYON OIL FIELD



CONTOURS ON S₁B ELECTRIC LOG MARKER

CAT CANYON OIL FIELD

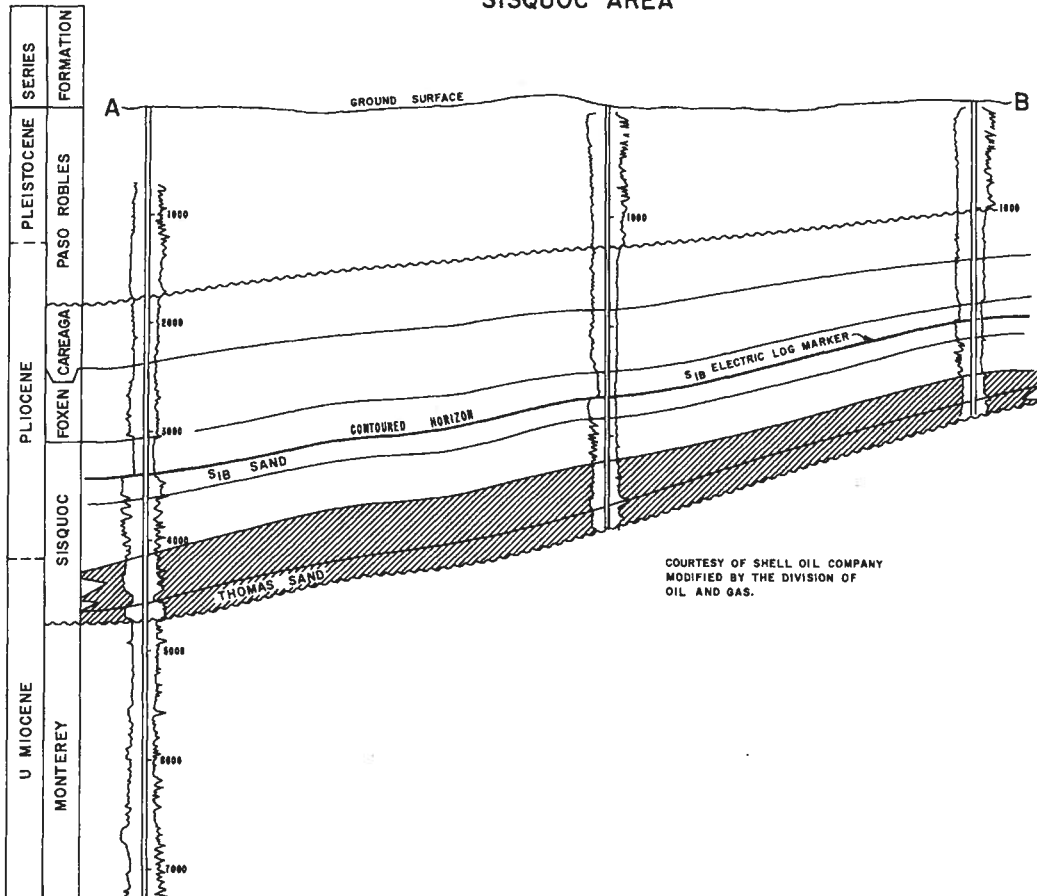
East Area and Central Area



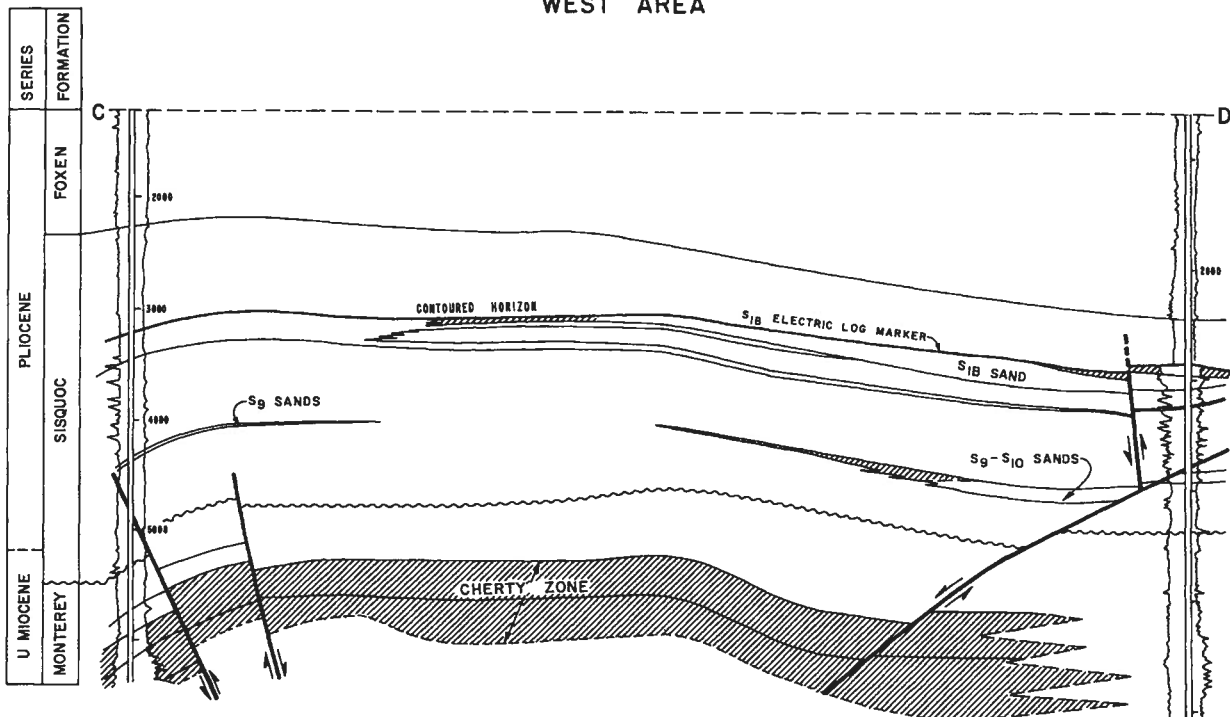
CAT CANYON OIL FIELD

Sisquoc Area and West Area

SISQUOC AREA

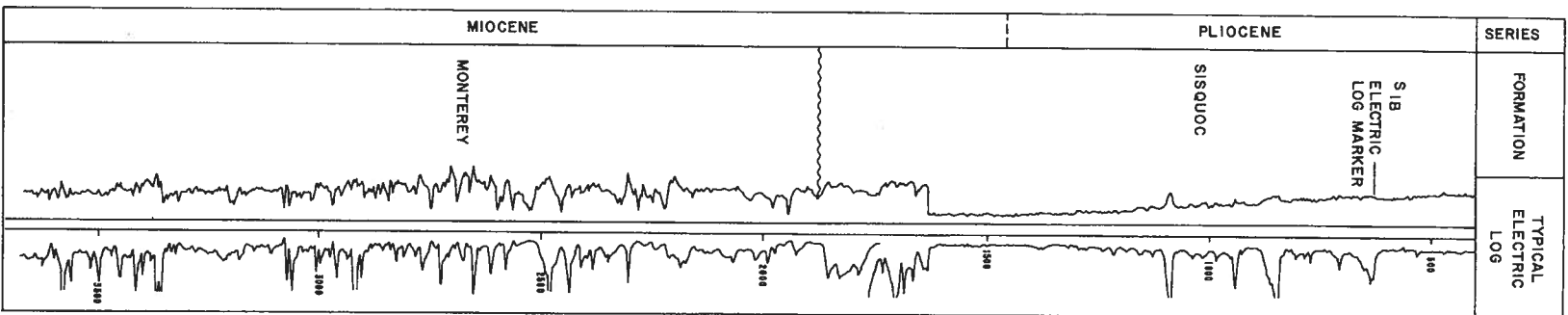


WEST AREA

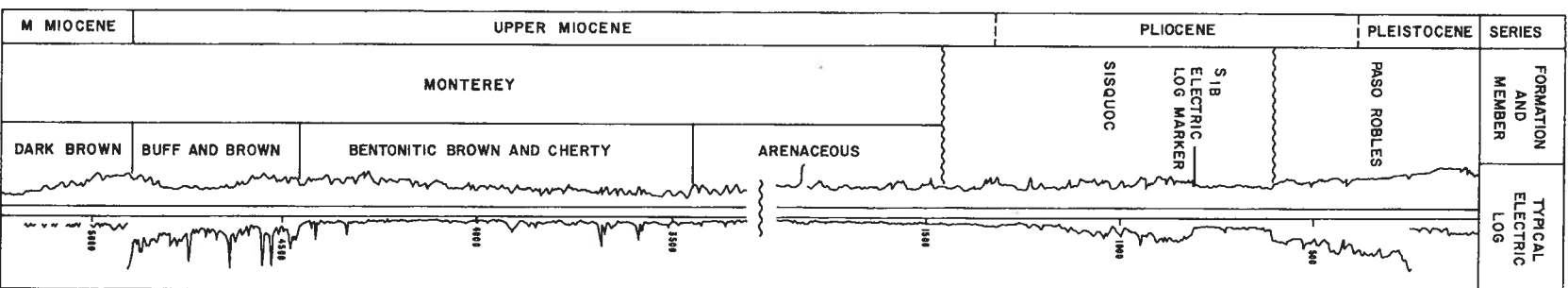


CAT CANYON OIL FIELD

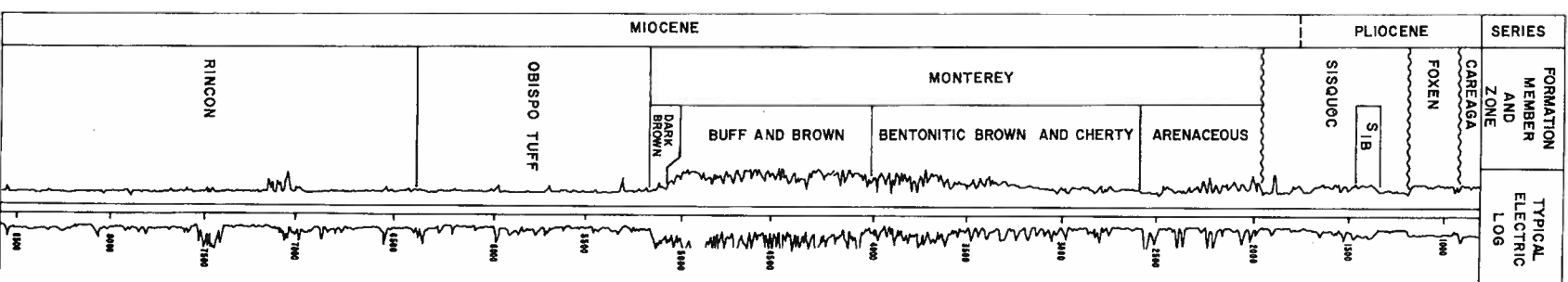
GATO RIDGE AREA



TINAUAIC AREA



OLIVERA CANYON AREA



COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD

(SEE AREAS FOR ADDITIONAL INFORMATION)

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	B.&M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Union Oil Co. of Calif. "Palmer Stendel" (Old) 1	Palmer Union Oil Co. Well No. 1	26 9N 33W	SB	3,200	Sisquoc	
Deepest well	Shell Western Expl. & Prod. Inc. "Studer" 45-17	Marathon Oil Co. "Studer" 45-17	17 9N 33W	SB	9,887 a/		Monterey Miocene

POOL DATA

ITEM	SISQUOC					FIELD OR AREA DATA
Discovery date	1908					
Initial production rates						
Oil (bbl/day)	150					
Gas (Mcf/day)	-					
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)	1,000					
Reservoir temperature (°F)	105					
Initial oil content (STB/ac-ft.)	1,700					
Initial gas content (MSCF/ac-ft.)	0					
Formation	Sisquoc					
Geologic age	Pliocene					
Average depth (ft.)	2,800					
Average net thickness (ft.)	600					
Maximum productive area (acres)						8,970

RESERVOIR ROCK PROPERTIES

Porosity (%)	27-31					
So _i (%)	68-70					
Sw _i (%)	30-32					
Sg _i (%)						
Permeability to air (md)	150-500					

RESERVOIR FLUID PROPERTIES

Oil:						
Oil gravity (°API)	13-15					
Sulfur content (% by wt.)	3.83					
Initial solution GOR (SCF/STB)						
Initial oil FVF (RB/STB)						
Bubble point press. (psia)						
Viscosity (cp) @ °F	90-110 @ 105					
Gas:						
Specific gravity (air = 1.0)						
Heating value (Btu/cu. ft.)						
Water:						
Salinity, NaCl (ppm)	18,000-25,000					
T.D.S. (ppm)	20,000-26,000					
R _w (ohm-m) (77°F)	0.40-0.58					

ENHANCED RECOVERY PROJECTS

Enhanced recovery projects						
Date started						
Date discontinued						
Peak oil production (bbl)						8,373,328
Year						1953
Peak gas production, net (Mcf)						6,597,998
Year						1967

Base of fresh water (ft.): See areas

Remarks: Four Deer Oil Field was originally classified as an area of Cat Canyon Oil Field.
a/ Directional well; true vertical depth is 9,810 feet.

Selected References: Prutzman, P.W., 1912, Petroleum in Southern California: Calif. State Mining Bureau Bull. 63.
Woodring, M.P., and M.N. Bramlette, 1950, Geology and Paleontology of the Santa Maria District, California: U.S. Geol. Survey Prof. Paper 222, p. 120.

DATE: January 1989

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
EAST AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	S.&M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Shell Western Expl. & Prod. Inc. "Field Fee" 1	Brooks Oil Co. Well No. 1	31 9N 32W	SB	3,098	Brooks	
Deepest well	Shell Western Expl. & Prod. Inc. "Victory" 20	Palmer Union Oil Co. "Stendel" 20	30 9N 32W	SB	7,200		Knoxville Cretaceous

POOL DATA

ITEM	SISQUOC	BROOKS	MONTEREY			FIELD OR AREA DATA
Discovery date	June 1953	1909	October 1953			
Initial production rates						
Oil (bbl/day)	25	150	72/			
Gas (Mcf/day)	-	-	-			
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)	1,100	1,150	-			
Reservoir temperature (°F)	100-150	135	-			
Initial oil content (STB/ac-ft.)	1,600	2,000	-			
Initial gas content (MSCF/ac-ft.)	231	-	-			
Formation	Sisquoc	Sisquoc	Monterey			
Geologic age	Pliocene	Pliocene	Miocene			
Average depth (ft.)	3,000	3,500	-			
Average net thickness (ft.)	250	150	-			
Maximum productive area (acres)						1,970
RESERVOIR ROCK PROPERTIES						
Porosity (%)	30-35***	35	fractured shale			
So ₂ (%)	60-70***	85	-			
Sw _i (%)	30-40***	15	-			
Sg _i (%)			-			
Permeability to air (md)	1,480	3,350	-			
RESERVOIR FLUID PROPERTIES						
Oil:						
Oil gravity (°API)	9-18	6-11	6			
Sulfur content (% by wt.)	4.1	6.0	-			
Initial solution						
GOR (SCF/STB)	700	300	-			
Initial oil FVF (RB/STB)	1.06	-	-			
Bubble point press. (psia)						
Viscosity (cp) @ T _r	-	15,000 @ 135	-			
Gas:						
Specific gravity (air = 1.0)						
Heating value (Btu/cu. ft.)						
Water:						
Salinity, NaCl (ppm)	5,485	7,242	5,660			
T.D.S. (ppm)	5,956	8,323	6,631			
R _w (ohm/m) (77°F)	-	0.12	0.13			
ENHANCED RECOVERY PROJECTS						
Enhanced recovery projects	steamflood	steamflood				
Date started	1979	1967				
Date discontinued	1990	1990				
	cyclic steam	cyclic steam				
	1964	1964				
	active	active				
Peak oil production (bbl)						b/
Year						b/
Peak gas production, net (Mcf)						
Year						
Base of fresh water (ft.): 1,000						
Remarks:	A portion of this area was formerly known as the Slick-Moorman area. a/ Commingled with production from the Brooks Sand. b/ Early production not broken down by area.					
Selected References:	Bailey, Wm. C., 1953, Operations in District No. 3: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 39, No. 2. Cross, R.K., 1940, East Cat Canyon Area of the Cat Canyon Oil Field: Calif. State Div. of Mines Bull. 118, p. 435. Prutzman, P.W., 1912, Petroleum in Southern California: Calif. State Mining Bureau Bull. 63 p. 379. Vonde, T.R., 1982, Specialized Pumping Techniques Applied to a Very Low Gravity Sand-Laden Crude, Cat Canyon Field, California: SPE Journal of Petroleum Technology, Vol. 34, No. 9, p. 1951. Woodring, W.P. and M.N. Bramlette, 1950, Geology and Paleontology of the Santa Maria District, Calif.: U.S. Geol. Survey Prof. Paper 222, p. 121.					

DATE: January 1991 ***Representative values for area, formation, and depth

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
CENTRAL AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	B.&M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Texaco Producing Inc. "Los Alamos" 32	Pacific Western Oil Corp. "Los Alamos" 32	6 8N 32W	SB	5,210	Sisquoc	Monterey Miocene
Deepest well	Same as above	"	"	"	"	"	"

POOL DATA

ITEM	SISQUOC a/					FIELD OR AREA DATA
Discovery date	May 1956					
Initial production rates						
Oil (bbl/day)	184					
Gas (Mcf/day)	-					
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)	1,100					
Reservoir temperature (°F)	103					
Initial oil content (STB/ac-ft.)	1,600					
Initial gas content (MSCF/ac-ft.)						
Formation	Sisquoc					
Geologic age	Pliocene					
Average depth (ft.)	2,800					
Average net thickness (ft.)	45					
Maximum productive area (acres)	620					
RESERVOIR ROCK PROPERTIES						
Porosity (%)	32-37***					
Soi (%)	60-70***					
Swi (%)	30-40***					
Sgi (%)						
Permeability to air (md)	400-2,000***					
RESERVOIR FLUID PROPERTIES						
Oil:						
Oil gravity (°API)	7-15					
Sulfur content (% by wt.)						
Initial solution GOR (SCF/STB)						
Initial oil FVF (RB/STB)						
Bubble point press. (psia)						
Viscosity (cp) @ °F						
Gas:						
Specific gravity (air = 1.0)						
Heating value (Btu/cu. ft.)						
Water:						
Salinity, NaCl (ppm)						
T.D.S. (ppm)						
R _w (ohm/m) (77°F)						
ENHANCED RECOVERY PROJECTS						
Enhanced recovery projects	waterflood					
Date started	1965					
Date discontinued	1986					
	fireflood					
	1963					
	1965					
	cyclic steam					
	1963					
	active					
Peak oil production (bbl)	b/					
Year						
Peak gas production, net (Mcf)	b/					
Year						

Base of fresh water (ft.): 800 - 1,300

Remarks: a/ Includes the S1b thru S9 sands.
b/ Early production not broken down by areas.

Selected References: Bailey, Wm. C., 1956, Operations in District No. 3: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 42, No. 2, p. 93.

DATE: January 1989 ***Representative values for area, formation, and depth

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
SISQUOC AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	B. & M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	B.E. Conway "Goodwin" 1	Union Oil Co. of Calif. "Santa Maria Realty" 1	10 9N 33W	SB	5,415 a/	Sisquoc-Monterey	
Deepest well	Chevron U.S.A. Inc. "Fugler" 4-10	Standard Oil Co. of Calif. "Fugler" 4-10	10 9N 33W	SB	7,934		Point Sal Miocene

POOL DATA

ITEM	FOXEN	SISQUOC ^{b/}	THOMAS	MONTEREY		FIELD OR AREA DATA
Discovery date	May 1980	December 1944	November 1954	December 1944		
Initial production rates						
Oil (bbl/day)	4c/	69d/	89	69		
Gas (Mcf/day)						
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)	350	820-1,300	1,700-1,900	2,000		
Reservoir temperature (°F)	79	105-120	130-120	180		
Initial oil content (STB/ac.-ft.)	1,580	1,780	-	325		
Initial gas content (MSCF/ac.-ft.)						
Formation	Foxen	Sisquoc	Sisquoc	Monterey		
Geologic age	Pliocene	Pliocene	Pliocene	Miocene		
Average depth (ft.)	1,750	2,750	4,900	4,000		
Average net thickness (ft.)	50	500	70	500		
Maximum productive area (acres)						2,420

RESERVOIR ROCK PROPERTIES

Porosity (%)	30-35	25-33	20-33	fractured shale		
So ₂ (%)	68-73	50-70	30-50	-		
Sw ₂ (%)	27-32	20-50	33-60	-		
S _{gr} (%)	-	0-10	10-17	-		
Permeability to air (md)	358-1,280	750-2,000	300-500	-		

RESERVOIR FLUID PROPERTIES

Oil:						
Oil gravity (°API)	9.4	6.0-8.0	8.0-16.0	6.4-11.0		
Sulfur content (% by wt.)	-	4.5	-	-		
Initial solution GOR (SCF/STB)	-	0-100	-	-		
Initial oil FVF (RB/STB)	-	1.072	-	-		
Bubble point press. (psia)	-	-	-	-		
Viscosity (cp) @ °F	-	325 @ 130	35-40 @ 72	500 @ 180		
Gas:						
Specific gravity (air = 1.0)	-	0.66	0.80	-		
Heating value (Btu/cu. ft.)	-	-	-	-		
Water:						
Salinity, NaCl (ppm)	9,200+	588-13,332	18,700	10,550-17,300		
T.D.S. (ppm)	-	2,870-14,287	20,604	12,547-20,722		
R _w (ohm/m) (77°F)	0.60+	0.43-3.13	0.30	0.32-0.51		

ENHANCED RECOVERY PROJECTS

Enhanced recovery projects	cyclic steam	cyclic steam				
Date started	1980	1963				
Date discontinued	active	active				
		steamflood				
		1968				
		1986				
		waterflood				
		1970				
		1971				
		fireflood				
		1973				
		1978				
Peak oil production (bbl)						e/
Year						e/
Peak gas production, net (Mcf)						e/
Year						e/

Base of fresh water (ft.): 1,000 - 1,400

Remarks: A portion of this area was formerly known as the Bradley Canyon area.
a/ Original total depth. The well was subsequently redrilled to a total depth of 5,550 feet; true vertical depth is 5,534 feet.
b/ Includes the S₁ thru S₈ sands.
c/ Commingled with production from the Sisquoc.
d/ Commingled with production from the Monterey.
e/ Early production not broken down by area.

Selected References: Angrove T.J., 1970, Optimizing High Temperature Steam Stimulation Operations, SPE Paper 3178, presented at the California Regional Meeting of the Society of Petroleum Engineers of AIME, Santa Barbara, Calif., Oct. 28-30.
Bailey, Wm. C., 1954, Operations in District No. 3: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 40, No. 2.

DATE: January 1989 (Log derived value)

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
WEST AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	B.&M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Union Oil Co. of Calif. "Palmer Stendel" (Old) 1	Palmer Union Oil Co. Well No. 1	26 9N 33W	SB	3,200	Sisquoc	
Deepest well	Shell Western Expl. & Prod. Inc. "Studer" 45-17	Marathon Oil Co. "Studer" 45-17	17 9N 33W	SB	9,887 a/		Monterey Miocene

POOL DATA

ITEM	SISQUOC ^{b/}	S _g -S _{6A} GAS _{C/}	ALEXANDER ^{d/}	LOS FLORES	FIELD OR AREA DATA
Discovery date	1908	September 1960	March 1953	August 1938	
Initial production rates					
Oil (bbl/day)	150	-	200	716	
Gas (Mcf/day)	-	500	-	-	
Flow pressure (psi)	-	1,000-1,025	-	-	
Bean size (in.)	-	6/64	-	-	
Initial reservoir pressure (psi)	1,000	-	-	1,600-1,900	
Reservoir temperature (°F)	105	-	-	175-200	
Initial oil content (STB/ac.-ft.)	1,700	-	-	-	
Initial gas content (MSCF/ac.-ft.)	0	-	-	-	
Formation	Sisquoc	Sisquoc	Sisquoc	Monterey	
Geologic age	Pliocene	Pliocene	Pliocene	Miocene	
Average depth (ft.)	2,800	3,405	3,750	6,000	
Average net thickness (ft.)	600	45	200	1,500	
Maximum productive area (acres)	-	40	-	-	2,880

RESERVOIR ROCK PROPERTIES

Porosity (%)	27-31	27-31	23-30	fractured shale	
So _i (%)	68-70	-	791	-	
Sw _i (%)	30-32	11-131	211	-	
S _{gi} (%)	-	87-891	-	-	
Permeability to air (md)	150-500	150-500	150-400	-	

RESERVOIR FLUID PROPERTIES

Oil:					
Oil gravity (°API)	13.0-16.5	-	23.0	11.0-22.0	
Sulfur content (% by wt.)	3.03	-	3.13	5.07	
Initial solution GOR (SCF/STB)	800	-	766	1,000-6,300	
Initial oil FVF (RB/STB)					
Bubble point press. (psia)					
Viscosity (cp) @ °F	3,100 @ 100	-	-	1,200 @ 100	
Gas:					
Specific gravity (air = 1.0)					
Heating value (Btu/cu. ft.)					
Water:					
Salinity, NaCl (ppm)	18,000-25,000	-	20,544	9,700-13,000	
T.D.S. (ppm)	20,000-26,000	-	-	15,500-18,000	
R _w (ohm/m) (77°F)	0.25-0.33	-	-	0.39-0.56	

ENHANCED RECOVERY PROJECTS

Enhanced recovery projects	waterflood			gas injection	
Date started	1954			1947	
Date discontinued	active			1955	
	cyclic steam			waterflood	
	1964			1972	
	active			1974	
Peak oil production (bbl)					e/
Year					e/
Peak gas production, net (Mcf)		143,086			
Year		1961			

Base of fresh water (ft.): 1,000

Remarks: a/ Directional well; true vertical depth is 9,810 feet. b/ Includes the S₁ through S₆ sands; formerly called the Pliocene pool.
 c/ The zone was abandoned in 1978. Cumulative production is 310,000 Mcf of gas. Only one well, Mobil Oil Corp. "Los Flores" 109-21, produced from this zone. d/ Includes the S₉ thru S₁₀ sands. e/ Early production not broken down by area.

Selected References:
 Huey, W.F., 1954, West Cat Canyon Area of Cat Canyon Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 40, No. 1.
 Manlove, C., 1938, West Cat Canyon Oil Field: Calif. State Div. of Mines Bull. 118, p. 432.
 Prutzman, P.W., 1912, Petroleum in Southern California: Calif. State Mining Bureau Bull. 63, p. 382.
 Regan, L.J. Jr., and A.W. Hughes, 1949, Fractured Reservoirs of Santa Maria District, California: Am. Assoc. Petroleum Geologists Bull., Vol. 33, No. 1, p. 32.
 Woodring, W.P., and M.N. Bramlette, 1950, Geology and Paleontology of the Santa Maria District, California: U.S. Geol. Survey Prof. Paper 222, p. 120.

DATE: January 1989 ILog derived value

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
GATO RIDGE AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	S.&M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Pinal Dome Corp. Well No. T-2	Pinal Dome Oil Co. Well No. T-2	15 8N 32W	SB	3,400	Monterey	
Deepest well	Gato Corp. "Tognazzini" 1	Barnsdall Oil Co. of Calif. "Tognazzini" 1	9 8N 32W	SB	6,510		Monterey Miocene

POOL DATA

ITEM	SISQUOC	MONTEREY				FIELD OR AREA DATA
Discovery date	March 1937	January 1915				
Initial production rates						
Oil (bbl/day)	580 ^a /	50				
Gas (Mcf/day)	-	0				
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)	-	500**				
Reservoir temperature (°F)	110	110-160**				
Initial oil content (STB/ac.-ft.)						
Initial gas content (MSCF/ac.-ft.)						
Formation	Sisquoc	Monterey				
Geologic age	Pliocene	Miocene				
Average depth (ft.)	2,210	3,800				
Average net thickness (ft.)	200	300				
Maximum productive area (acres)						690

RESERVOIR ROCK PROPERTIES

Porosity (%)	25-32***	fractured shale				
So ₂ (%)	65***	-				
Sw ₁ (%)	35***	-				
S _{gi} (%)		-				
Permeability to air (md)	1,000-4,000	-				

RESERVOIR FLUID PROPERTIES

Oil:						
Oil gravity (°API)	13	9-14				
Sulfur content (% by wt.)	-	5.87				
Initial solution GOR (SCF/STB)						
Initial oil FVF (RB/STB)						
Bubble point press. (psia)						
Viscosity (cp) @ °F.	-	1,000 @ 160				
Gas:						
Specific gravity (air = 1.0)						
Heating value (Btu/cu. ft.)						
Water:						
Salinity, NaCl (ppm)	-	7,425				
T.D.S. (ppm)	-	11,500				
R _w (ohm/m) (77°F)						

ENHANCED RECOVERY PROJECTS

Enhanced recovery projects						
Date started						
Date discontinued						
Peak oil production (bbl)						b/
Year						
Peak gas production, net (Mcf)						b/
Year						

Base of fresh water (ft.): 0 - 400

Remarks: Pinal Dome Corp. well No. T-2 produced a total of 8,062 bbl of oil from March 1916 to June 1917. This production was not considered commercial at the time, and the well was abandoned in 1920.
a/ Commingled with production from the Monterey.
b/ Early production not broken down by area.

Selected References: Cross, R.K., 1940, Gato Ridge Area of Cat Canyon Oil Field: State Div. of Mines, Bull. 118, p. 438.
Doelman, S.G., 1931, Operations in District No. 3: Calif. Div. of Oil and Gas, Summary of Operations—Calif. Oil Fields, Vol. 17, No. 3, p. 34.
Woodring, W.P., and M.N. Bramlette, 1950, Geology and Paleontology of the Santa Maria District, California: U.S. Geol. Survey Prof. Paper 222, p. 121.

DATE: January 1989 **Estimated value ***Representative values for area, formation, and depth

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
TINAQUAIC AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	B. & M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Richards 011 Co. "Wickenden" 1	Four-Five-Six 011 Co. "Wickenden" 1	33 9N 32W	SB	4,606	Monterey	
Deepest well	Richards 011 Co. "Wickenden" 5	Continental 011 Co. "Wickenden" 5	33 9N 32W	SB	5,250		Monterey Miocene

POOL DATA

ITEM	MONTEREY					FIELD OR AREA DATA
Discovery date	February 1945 ^a /					
Initial production rates						
Oil (bbl/day)	90					
Gas (Mcf/day)	0					
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)						
Reservoir temperature (°F)	103					
Initial oil content (STB/ac-ft.)						
Initial gas content (MSCF/ac-ft.)						
Formation	Monterey					
Geologic age	Miocene					
Average depth (ft.)	2,020-3,180					
Average net thickness (ft.)	1,200-3,200					
Maximum productive area (acres)	70					
RESERVOIR ROCK PROPERTIES						
Porosity (%)	fractured shale					
So _i (%)						
Sw _i (%)						
Sg _i (%)						
Permeability to air (md)						
RESERVOIR FLUID PROPERTIES						
Oil:	6-8					
Oil gravity (°API)						
Sulfur content (% by wt.)						
Initial solution						
COR (SCF/STB)						
Initial oil FVF (RB/STB)						
Bubble point press. (psia)						
Viscosity (cp) @ °F						
Gas:						
Specific gravity (air = 1.0)						
Heating value (Btu/cu. ft.)						
Water:						
Salinity, NaCl (ppm)						
T.D.S. (ppm)						
R _w (ohm/m) (77°F)						
ENHANCED RECOVERY PROJECTS						
Enhanced recovery projects						
Date started						
Date discontinued						
Peak oil production (bbl)	7,342					
Year	1948					
Peak gas production, net (Mcf)						
Year						

Base of fresh water (ft.): 300 - 600

Remarks: ^a/ The heavy oil could not be produced efficiently using the techniques available at the time, and the well was abandoned in December 1945. The well was reentered, deepened to 4,972 feet, and completed by Foxen Ridge Oil Company in June-July 1948.

Selected References: Dolman, S.G., 1945, Operations in District No. 3: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 31, No. 2.

DATE: January 1989

CALIFORNIA DIVISION OF OIL AND GAS

COUNTY: SANTA BARBARA

CAT CANYON OIL FIELD
OLIVERA CANYON AREA

DISCOVERY WELL AND DEEPEST WELL

	Present operator and well designation	Original operator and well designation	Sec. T. & R.	S.&M.	Total depth (feet)	Pool (zone)	Strata & age at total depth
Discovery well	Shell Western Expl. & Prod. Inc. "McNee" 2	Union Oil Co. of Calif. "McNee" 2	20 9N 32W	SB	4,034	Monterey	
Deepest well	Shell Western Expl. & Prod. Inc. "McNee" 4	Union Oil Co. of Calif. "McNee" 4	20 9N 32W	SB	9,001		Rincon(?) Miocene

POOL DATA

ITEM	SISQUOC	MONTEREY ^{2/}				FIELD OR AREA DATA
Discovery date	October 1979	June 1944				
Initial production rates						
Oil (bbl/day)	34	37				
Gas (Mcf/day)						
Flow pressure (psi)						
Bean size (in.)						
Initial reservoir pressure (psi)	1,350***	1,400**				
Reservoir temperature (°F)	-	135**				
Initial oil content (STB/ac-ft.)						
Initial gas content (MSCF/ac-ft.)						
Formation	Sisquoc	Monterey				
Geologic age	Pliocene	Miocene				
Average depth (ft.)	2,550	3,000				
Average net thickness (ft.)	20	1,500				
Maximum productive area (acres)						240
RESERVOIR ROCK PROPERTIES						
Porosity (%)	25-32***	fractured shale				
Soi (%)	65***	-				
Swi (%)	35***	-				
Sgt (%)		-				
Permeability to air (md)	1,000-4,000***	-				
RESERVOIR FLUID PROPERTIES						
Oil:						
Oil gravity (°API)	8.4	6.0-8.0				
Sulfur content (% by wt.)						
Initial solution GOR (SCF/STB)						
Initial oil FVF (RB/STB)						
Bubble point press. (psia)		750 @ 135**				
Viscosity (cp) @ °F						
Gas:						
Specific gravity (air = 1.0)						
Heating value (Btu/cu. ft.)						
Water:						
Salinity, NaCl (ppm)	2,605	11,984-24,800				
T.D.S. (ppm)	3,765	17,660-30,002				
R _w (ohm/m) (77°F)	1.80	0.23-0.34				
ENHANCED RECOVERY PROJECTS						
Enhanced recovery projects						
Date started						
Date discontinued						
Peak oil production (bbl)						
Year	15,911	369,422				
Peak gas production, net (Mcf)						
Year	1981	1953				

Base of fresh water (ft.): 600

Remarks: a/ Includes Cherty, Bentonitic Brown, and Buff & Brown zones.

Selected References: Dolman, S.G., 1944, Operations in District No. 3: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 30, No. 2, p. 43.

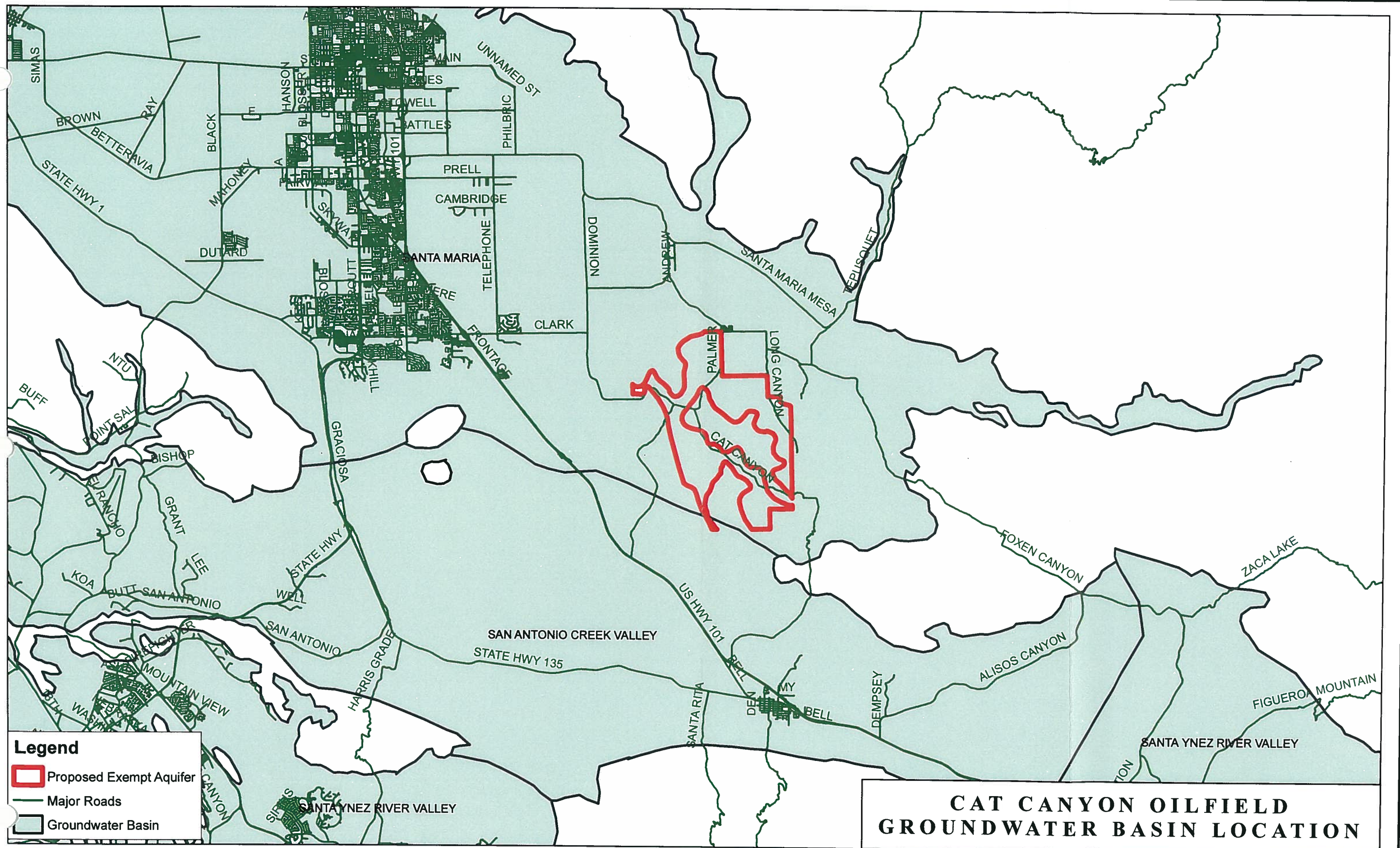
DATE: January 1989 **Estimated value ***Representative values for area, formation, and depth

CALIFORNIA DIVISION OF OIL AND GAS



Exhibit 5

Department of Water Resources Groundwater Basins



Legend

- Proposed Exempt Aquifer
- Major Roads
- Groundwater Basin

**CAT CANYON OILFIELD
GROUNDWATER BASIN LOCATION**



Exhibit 6

Department of Water Resources Designated Analysis Units

CALIFORNIA **DETAILED ANALYSIS UNITS**

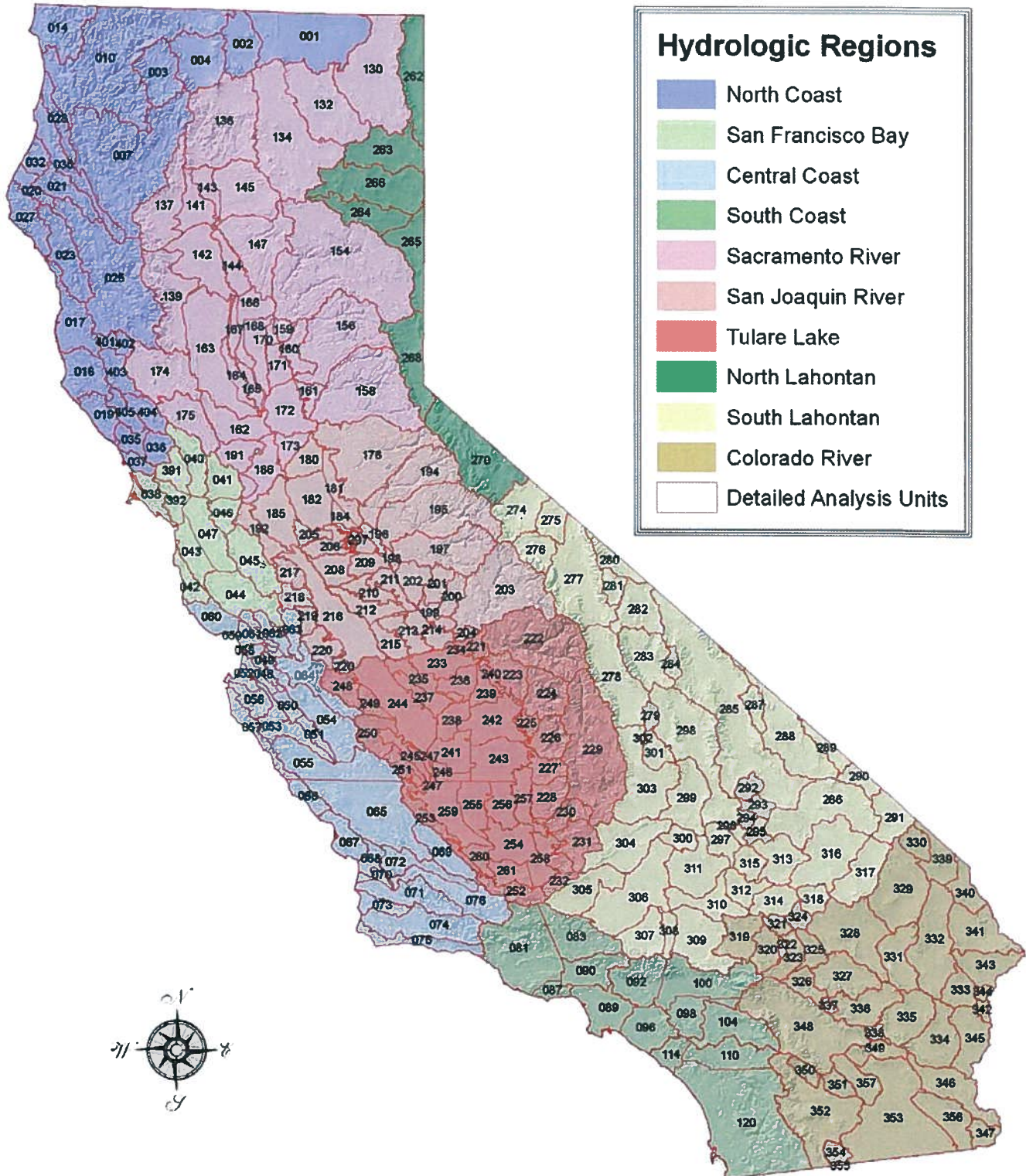




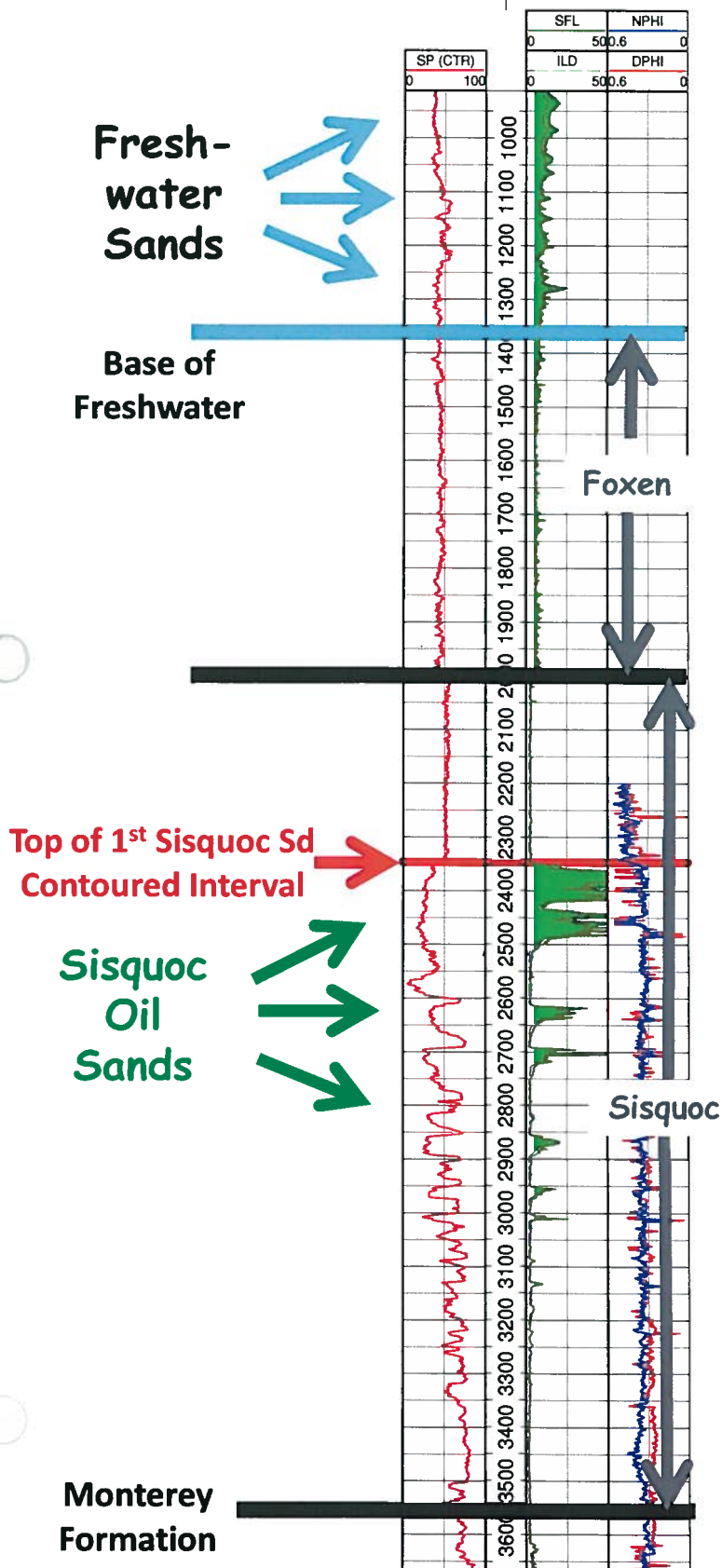
Exhibit 7

Type Log

Type Log

ERG Operating Company LLC

G W P
307-24



Fresh Water Sands: Alluvial Deposits and Upper Pliocene shallow-water marine sediments, white to yellowish brown, unconsolidated to well-consolidated, coarse to fine grain, with some silt. Lower most fresh water bearing Formation in the Santa Maria Basin.

Foxen Sands: Pliocene shallow-water marine sediments, olive brown to olive green interbedded mudstone, siltstone, and fine grained sandstone.

Sisquoc Mudstone: Lower Pliocene moderately deep marine sediments, light gray, massive to thickly laminated silty diatomaceous claystone or silty clayey diatomite. forms impermeable seal to Sisquoc oil bearing sands.

Sisquoc Oil Sands: Lower Pliocene moderately deep marine sediments, dark brown to mottled gray streaks, unconsolidated, very fine to fine grained some medium grained, angular to sub rounded grains.

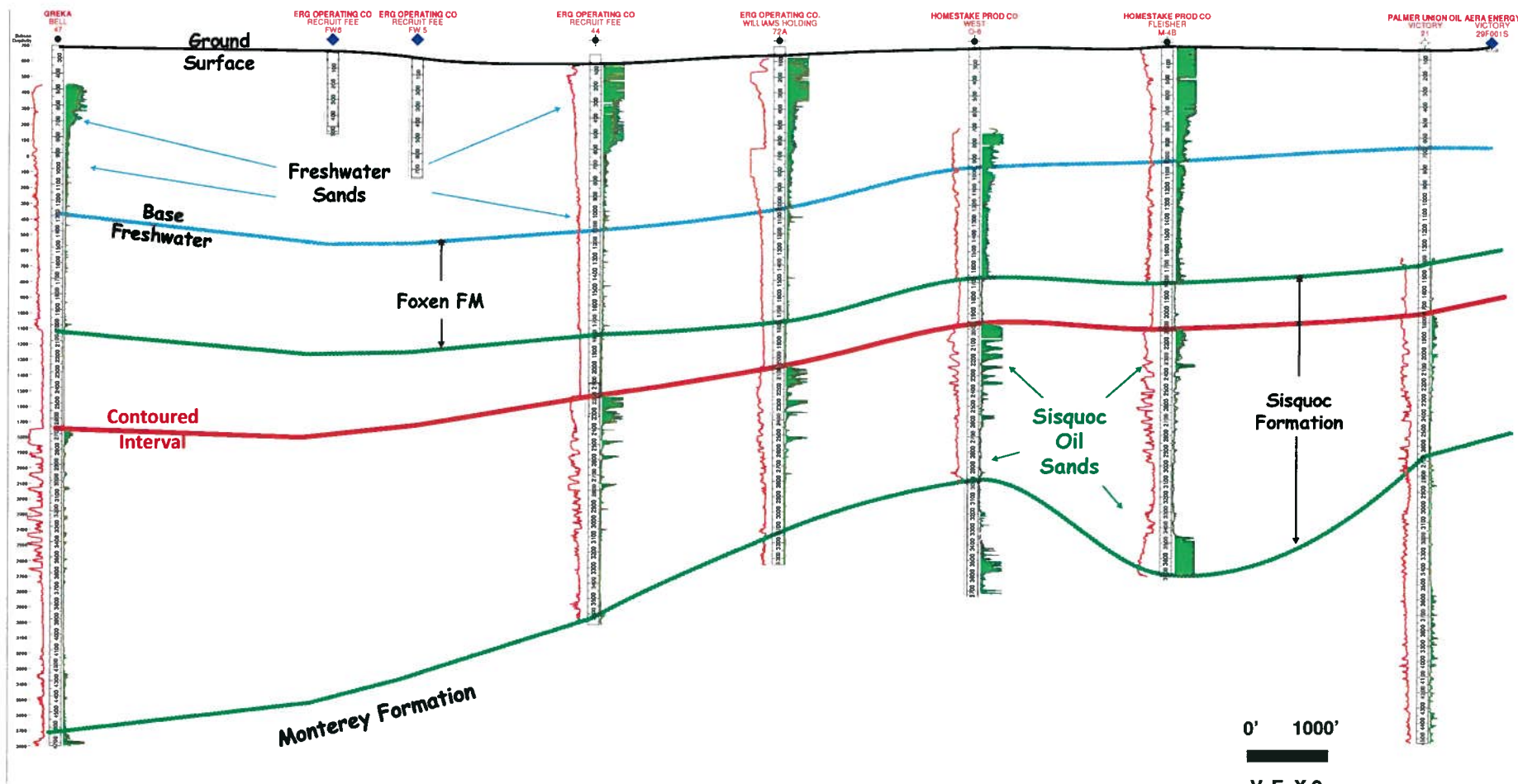


Exhibit 8
Structure Contour Map & Cross Sections

B
W

West-East Structural Cross Section

B'
E



A
S

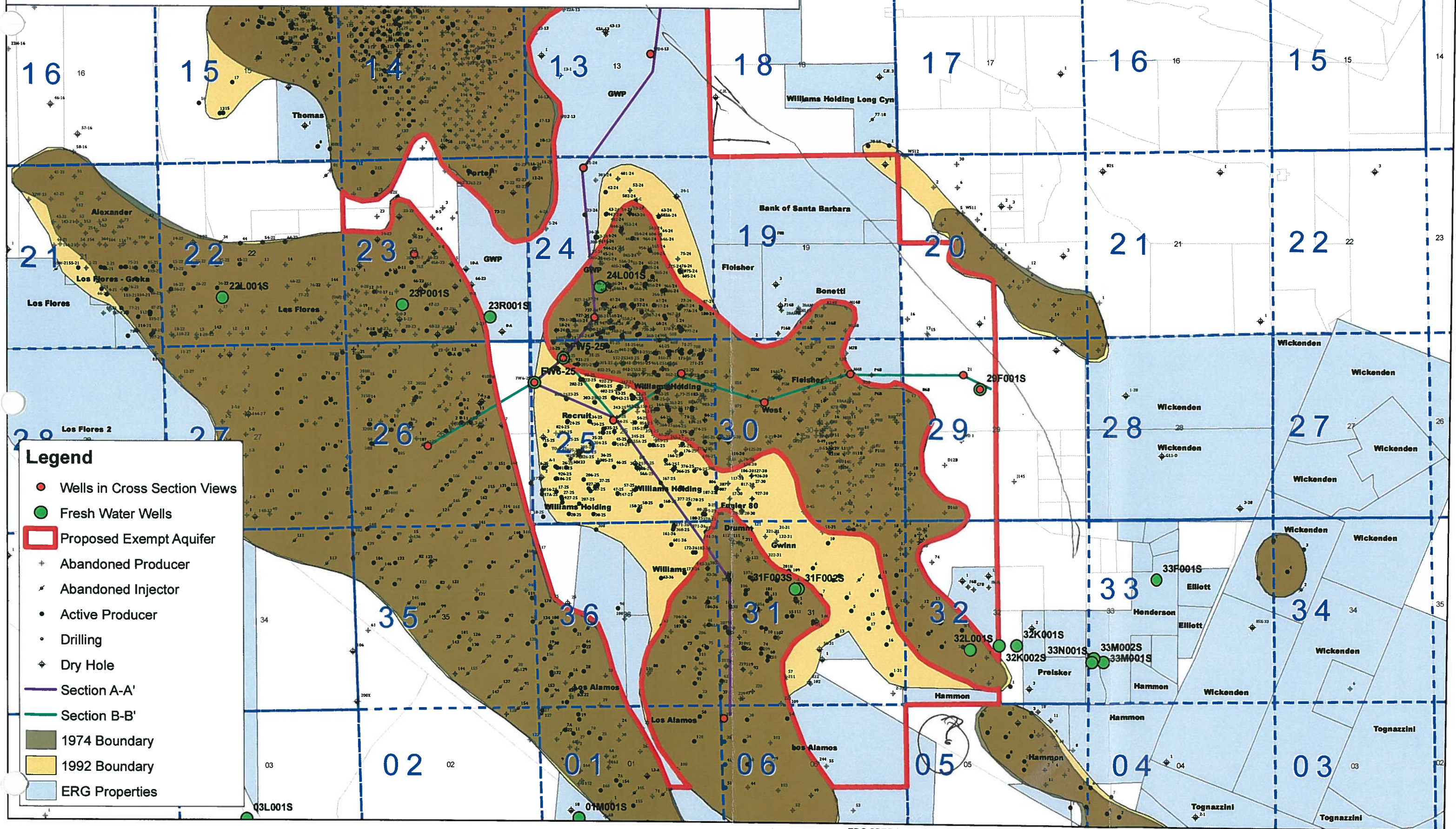




Exhibit 9

Production Data for Wells in Cross Sections

CAT CANYON OILFIELD AQUIFER EXEMPTION: CROSS-SECTION LOCATIONS



- Legend**
- Wells in Cross Section Views
 - Fresh Water Wells
 - Proposed Exempt Aquifer
 - Abandoned Producer
 - Abandoned Injector
 - Active Producer
 - Drilling
 - Dry Hole
 - Section A-A'
 - Section B-B'
 - 1974 Boundary
 - 1992 Boundary
 - ERG Properties



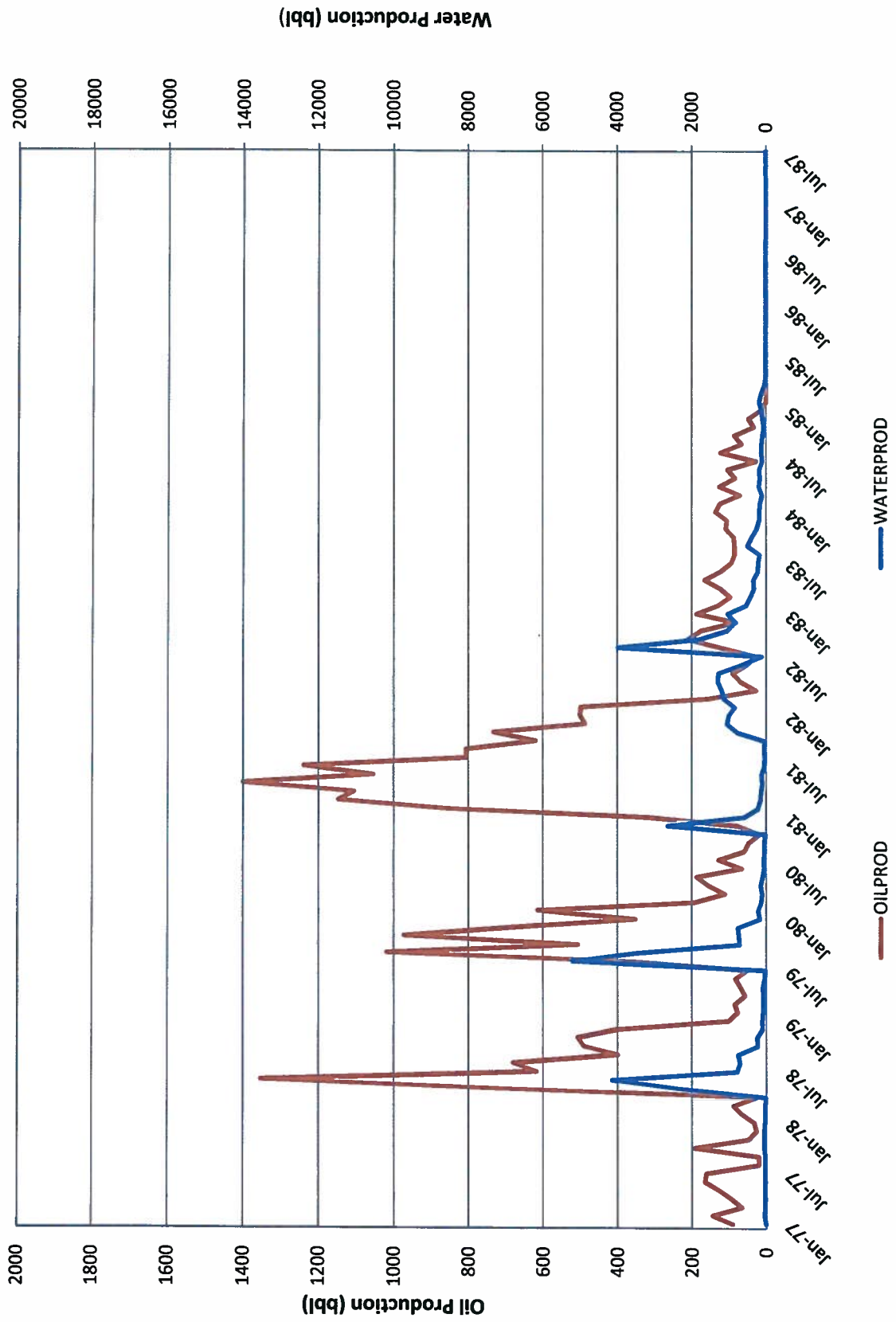
0 0.5 1 2 Miles



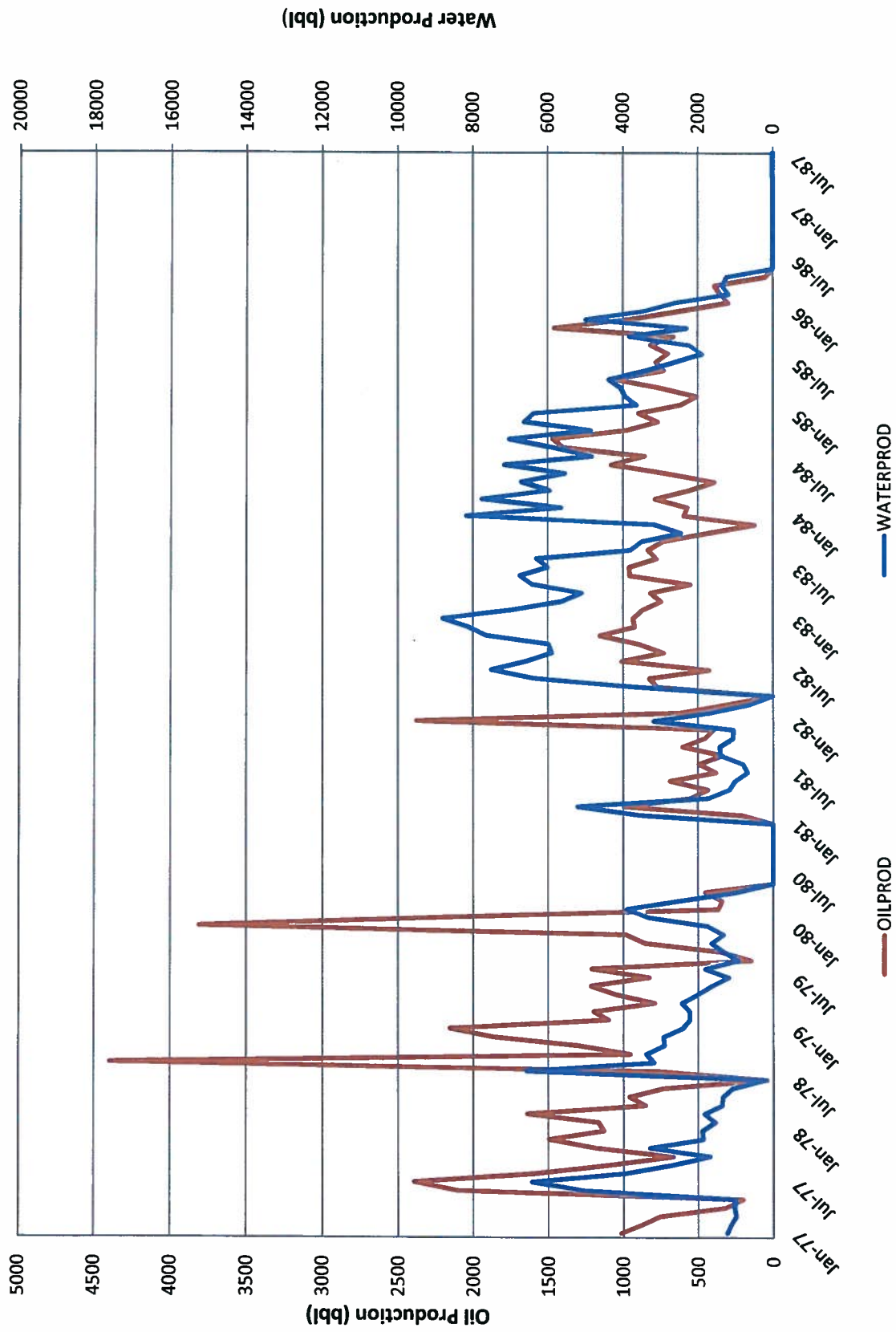
ERG OPERATING COMPANY, LLC
CAT CANYON OILFIELD
SANTA BARBARA COUNTY, CALIFORNIA
MAY 9, 2013

ERG OPERATING COMPANY
CAT CANYON OILFIELD

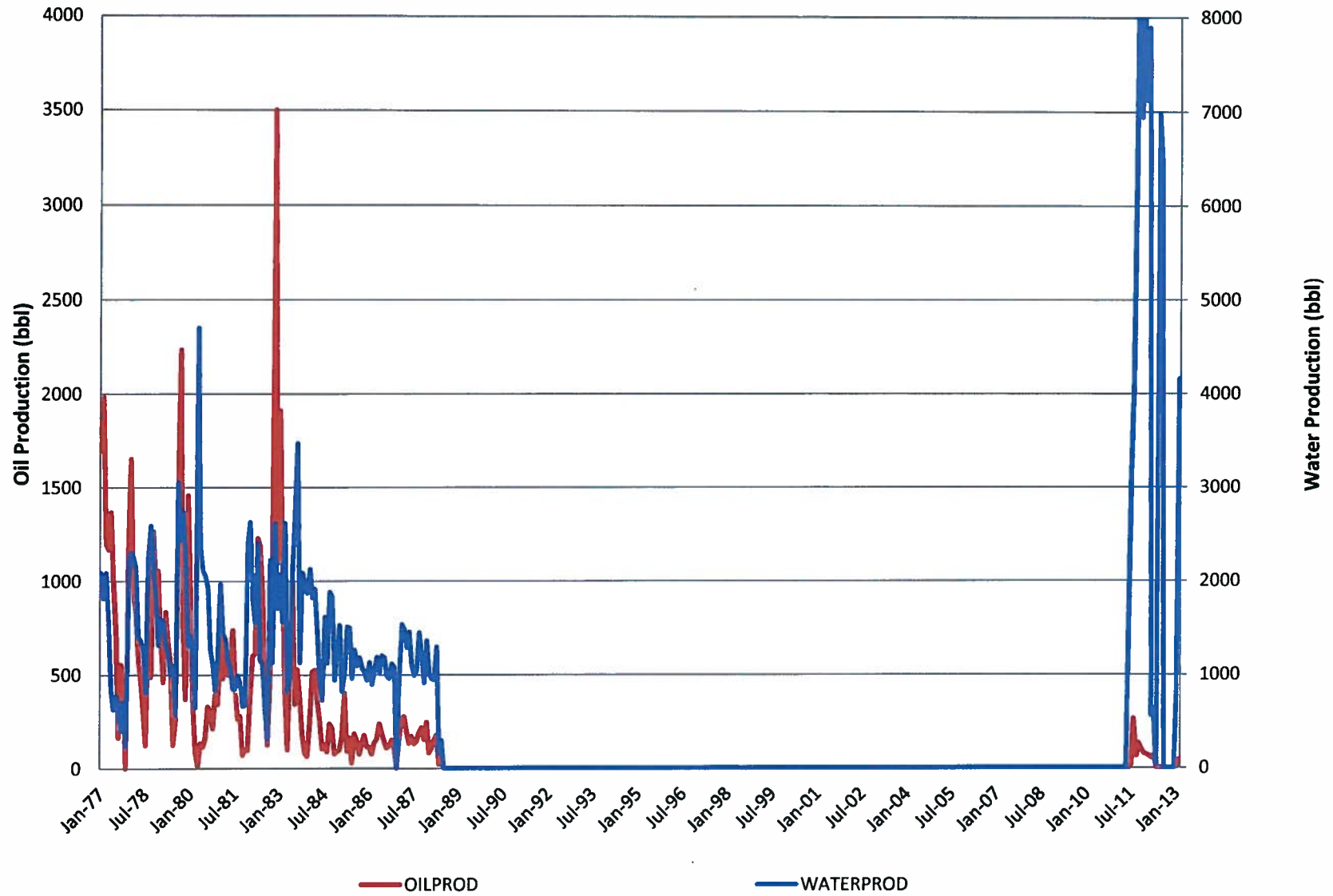
ERG - GWP 31-24 Production Data



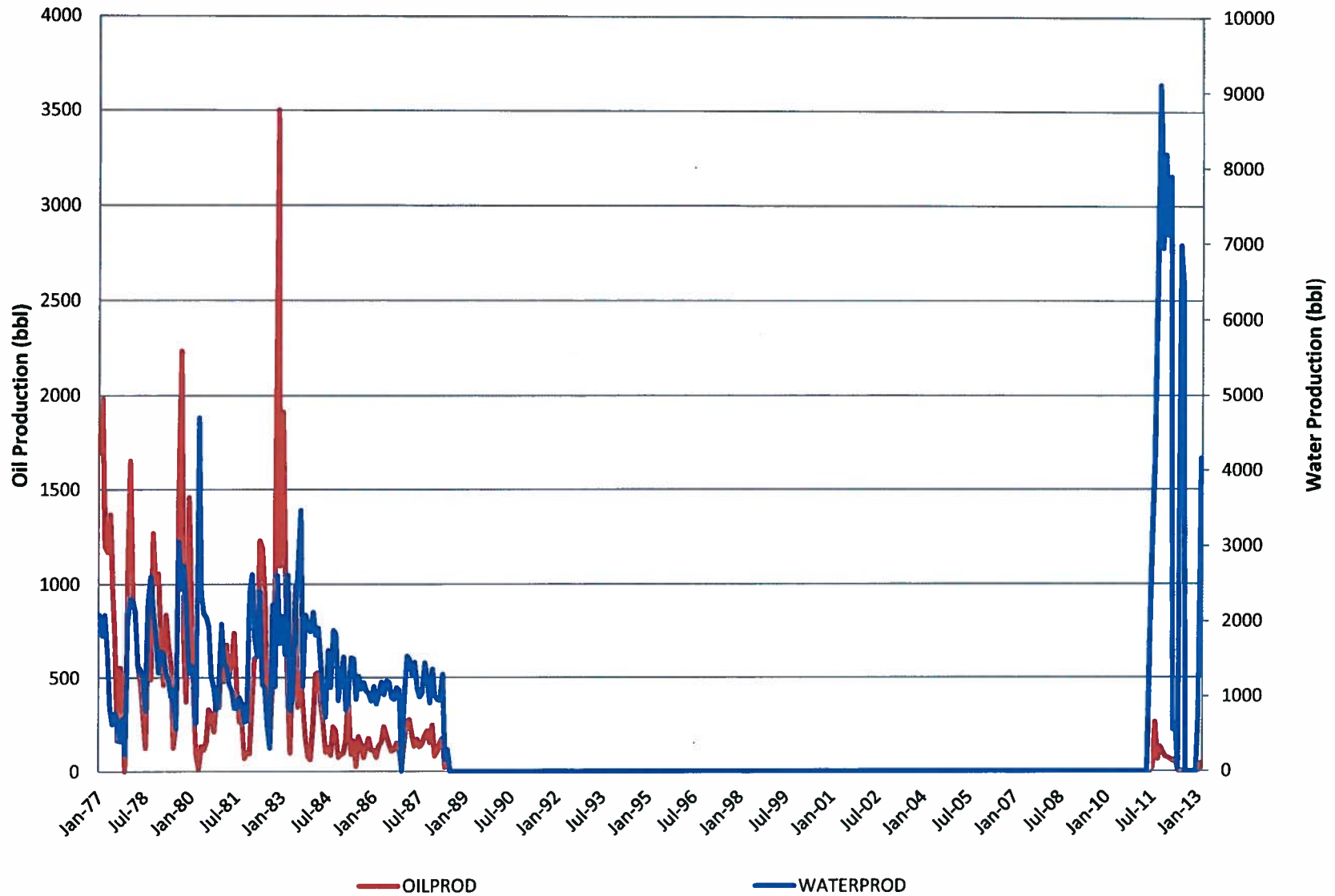
ERG - GWP 307-24 Production Data



ERG - Recruit 44 Production Data



ERG - Los Alamos 32 Production Data



ERG - Williams Holding 72A Production Data

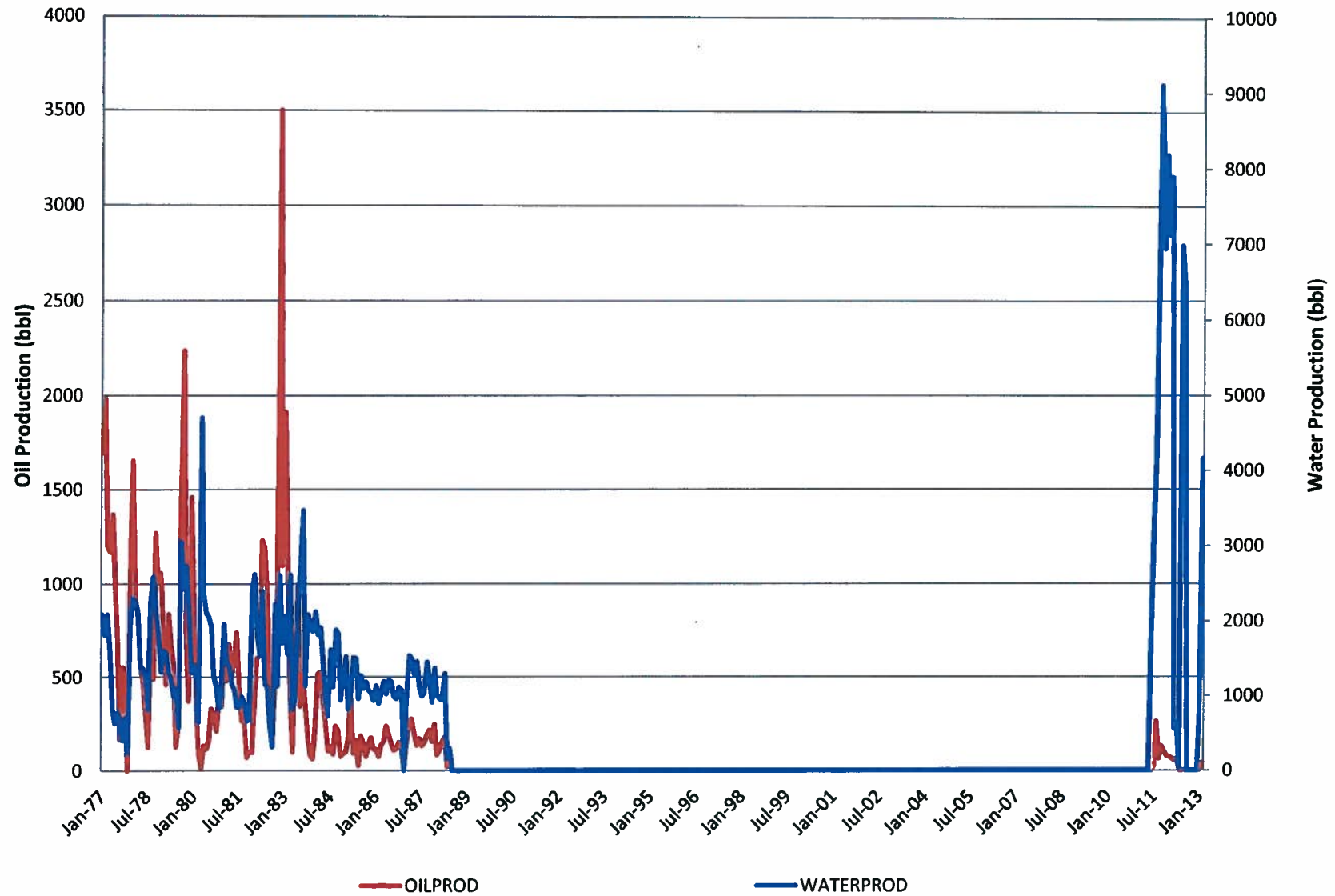




Exhibit 10
Isopach Map

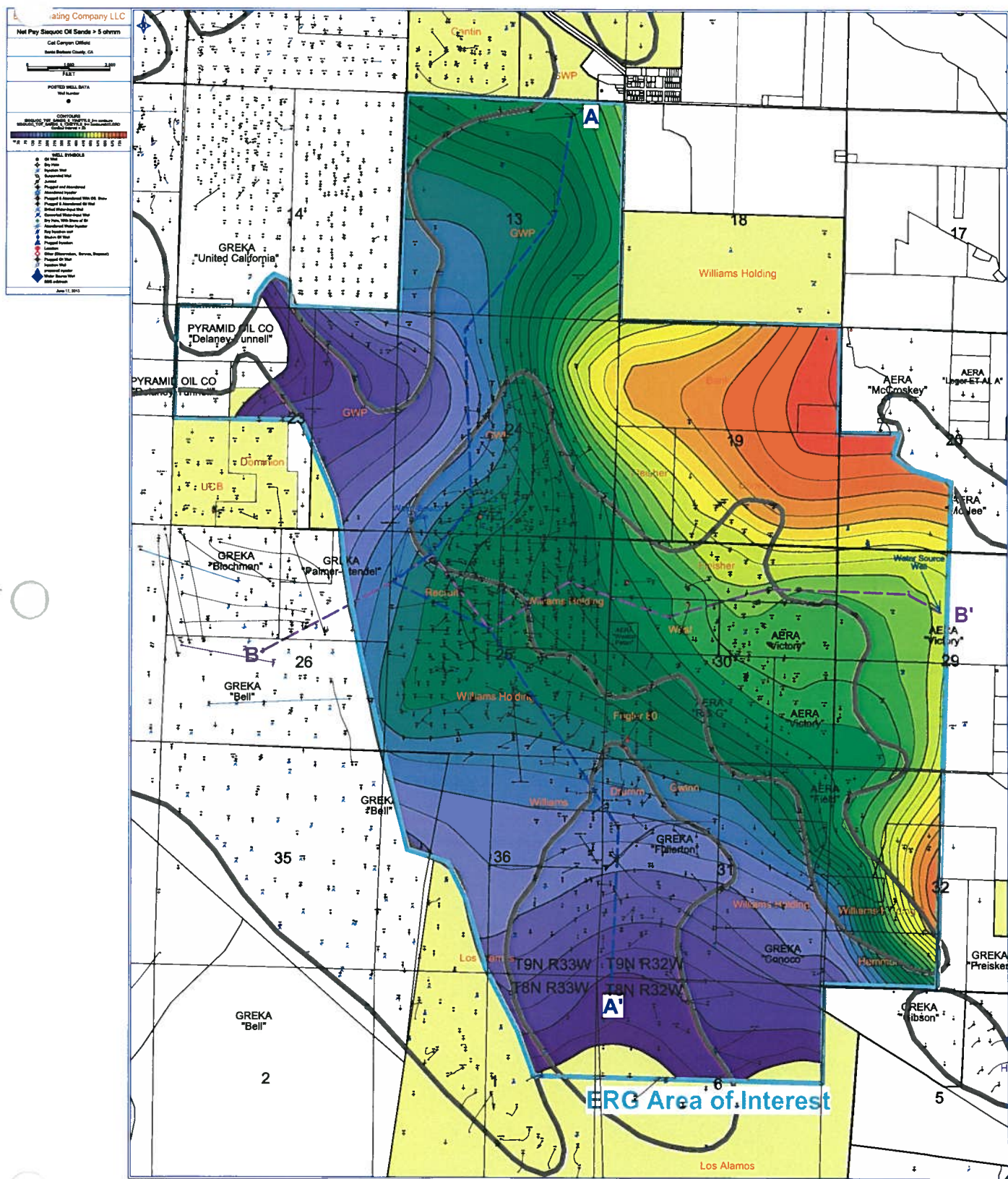




Exhibit 11

Map of Depth to Sisquoc Saturated Sands

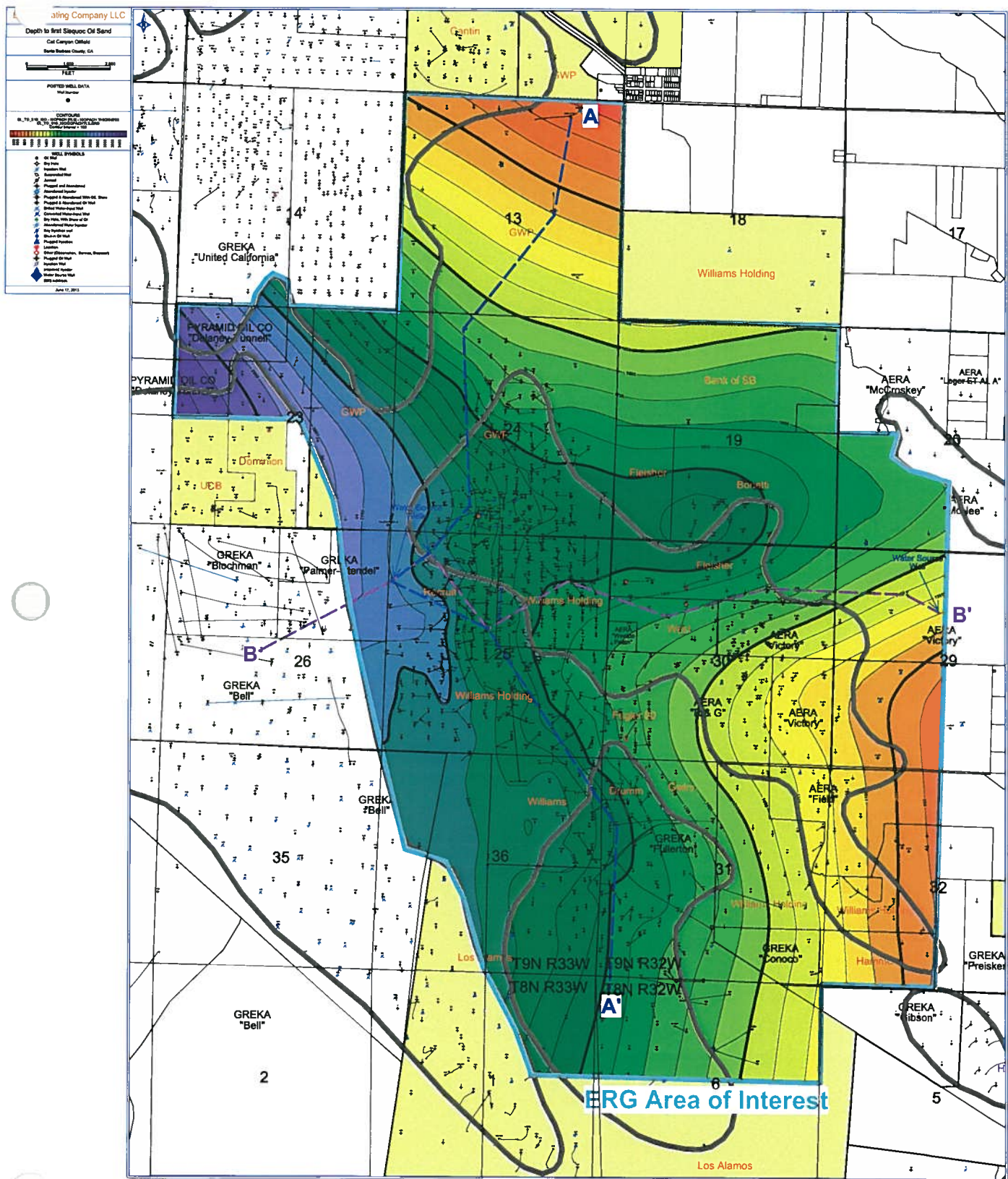
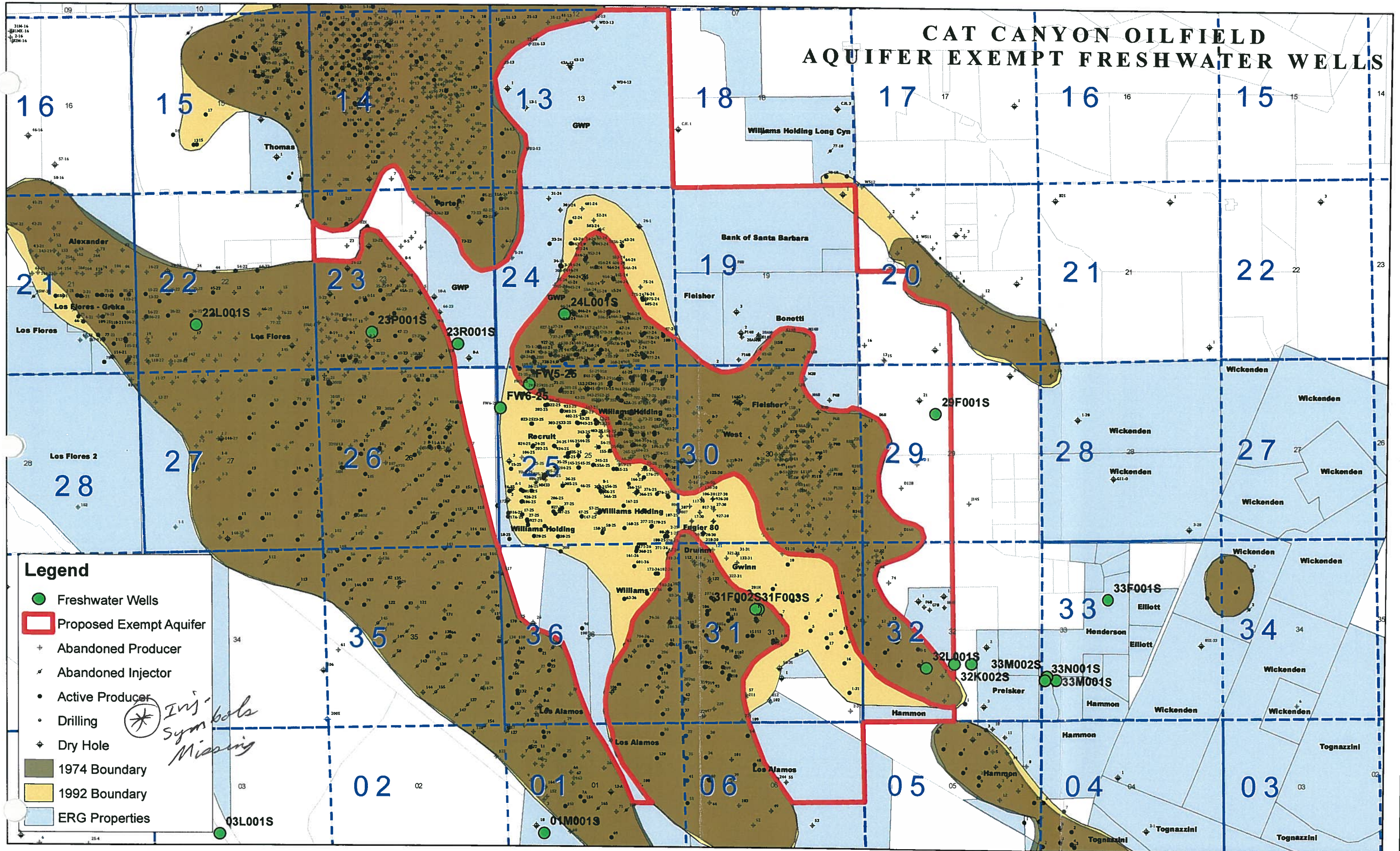




Exhibit 12

Known Fresh Water Wells Map

CAT CANYON OILFIELD AQUIFER EXEMPT FRESHWATER WELLS



ERG

0 0.5 1 2 Miles



ERG OPERATING COMPANY, LLC
CAT CANYON OILFIELD
SANTA BARBARA COUNTY, CALIFORNIA
MAY 1, 2013

ERG OPERATING COMPANY
CAT CANYON OILFIELD



Exhibit 13

Fresh Water Analysis for ERG's Wells



Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW5
1205992-01 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Anions by IC, EPA Method 300.0/300.1/326

Chloride, Total	41	5.0	mg/l	10	W2K1390	30-Nov-12	30-Nov-12	EPA 300.0	
Fluoride, Total	0.36	0.10	"	1	"	"	30-Nov-12	"	
Nitrite as N	ND	150	ug/l	"	"	"	"	"	
Nitrate as NO3	ND	0.50	mg/l	"	"	"	"	"	
Sulfate as SO4	34	5.0	"	10	"	"	30-Nov-12	"	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Alkalinity as CaCO3	150	10	mg/l	1	W2L0009	03-Dec-12	03-Dec-12	SM 2320B	
Carbonate Alkalinity as CaCO3	ND	2.0	"	"	"	"	"	"	
Bicarbonate Alkalinity as HCO3	180	10	"	"	"	"	"	"	
Hydroxide Alkalinity as CaCO3	ND	2.0	"	"	"	"	"	"	
Color	ND	3.0	Color Units	"	W2K1404	30-Nov-12	30-Nov-12	SM 2120B	
Specific Conductance (EC)	460	2.0	umhos/cm	"	W2L0149	05-Dec-12	05-Dec-12	SM 2510B	
MBAS	ND	0.050	mg/l	"	W2K1397	30-Nov-12	30-Nov-12	SM 5540C	
Threshold Odor Number	1.0	1.0	T.O.N.	"	W2K1405	30-Nov-12	30-Nov-12	EPA 140.1	O-07
pH	7.47	0.10	Units	"	W2K1406	30-Nov-12	30-Nov-12	SM 4500H+-B	*
Total Dissolved Solids	280	10	mg/l	"	W2L0043	03-Dec-12	05-Dec-12	SM 2540C	
Turbidity	7.0	0.10	NTU	"	W2K1401	30-Nov-12	30-Nov-12	EPA 180.1	

Metals by EPA 200 Series Methods

Calcium, Total	56.8	0.100	mg/l	1	W2L0020	03-Dec-12	04-Dec-12	EPA 200.7	
Magnesium, Total	2.96	0.100	"	"	"	"	"	"	
Silver, Total	ND	0.20	ug/l	"	W2L0023	03-Dec-12	06-Dec-12	EPA 200.8	
Aluminum, Total	ND	5.0	"	"	"	"	"	"	
Arsenic, Total	0.89	0.40	"	"	"	"	"	"	
Barium, Total	46	0.50	"	"	"	"	"	"	
Beryllium, Total	ND	0.10	"	"	"	"	"	"	
Calcium, Total	55	0.50	mg/l	5	"	"	06-Dec-12	"	
Cadmium, Total	ND	0.10	ug/l	1	"	"	06-Dec-12	"	
Chromium, Total	0.22	0.20	"	"	"	"	"	"	
Copper, Total	ND	0.50	"	"	"	"	"	"	
Iron, Total	850	20	"	"	"	"	"	"	
Potassium, Total	1.3	0.10	mg/l	"	"	"	"	"	

Oilfield Environmental and Compliance

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

307 Roemer Way, Suite 300, Santa Maria, CA 93454

www.oecusa.com

TEL: (805) 922-4772
FAX: (805) 925-3376



Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW5
1205992-01 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Metals by EPA 200 Series Methods

Magnesium, Total	2.9	0.10	mg/l	1	W2L0023	03-Dec-12	06-Dec-12	EPA 200.8	
Manganese, Total	27	0.20	ug/l	"	"	"	"	"	
Sodium, Total	29	0.10	mg/l	"	"	"	"	"	
Nickel, Total	ND	0.80	ug/l	"	"	"	"	"	
Lead, Total	ND	0.20	"	"	"	"	"	"	
Selenium, Total	ND	0.40	"	"	"	"	"	"	
Thallium, Total	ND	0.20	"	"	"	"	"	"	
Zinc, Total	ND	5.0	"	"	"	"	"	"	
Hardness as CaCO ₃ , Total	154	0.662	mg/l	"	[CALC]	03-Dec-12	04-Dec-12	EPA 200.7	
Mercury, Total	ND	0.050	ug/l	"	W2L0131	04-Dec-12	06-Dec-12	EPA 245.1	

Semivolatile Organic Compounds by GC/MS

Benzo (a) pyrene	ND	0.10	ug/l	1	W2L0018	03-Dec-12	04-Dec-12	EPA 525.2	
Bis(2-ethylhexyl)adipate	ND	5.0	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	3.0	"	"	"	"	"	"	
Alachlor	ND	0.10	"	"	"	"	"	"	
Atrazine	ND	0.10	"	"	"	"	"	"	
Bromacil	ND	0.50	"	"	"	"	"	"	
Butachlor	ND	0.10	"	"	"	"	"	"	
Captan	ND	1.0	"	"	"	"	"	"	
Chloropropham	ND	0.10	"	"	"	"	"	"	
Cyanazine	ND	0.10	"	"	"	"	"	"	
Diazinon	ND	0.10	"	"	"	"	"	"	
Dimethoate	ND	0.20	"	"	"	"	"	"	
Diphenamid	ND	0.10	"	"	"	"	"	"	
Disulfoton	ND	0.10	"	"	"	"	"	"	
EPTC	ND	0.10	"	"	"	"	"	"	
Metolachlor	ND	0.10	"	"	"	"	"	"	
Metribuzin	ND	0.10	"	"	"	"	"	"	
Molinate	ND	0.10	"	"	"	"	"	"	
Prometon	ND	0.10	"	"	"	"	"	"	
Prometryn	ND	0.10	"	"	"	"	"	"	
Simazine	ND	0.10	"	"	"	"	"	"	
Terbacil	ND	2.0	"	"	"	"	"	"	
Thiobencarb	ND	0.10	"	"	"	"	"	"	
Trithion	ND	0.10	"	"	"	"	"	"	

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6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW5
1205992-01 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Semivolatile Organic Compounds by GC/MS

Surrogate: 1,3-Dimethyl-2-nitrobenzene	95 %	73-136	W2L0018	03-Dec-12	04-Dec-12	EPA 525.2
Surrogate: Perylene-d12	96 %	48-141	"	"	"	"
Surrogate: Triphenyl phosphate	87 %	71-150	"	"	"	"

Volatile Organic Compounds by EPA Method 524.2

Dichlorodifluoromethane (Freon 12)	ND	0.50	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2
Chloromethane	ND	0.50	"	"	"	"	"	"
Vinyl chloride	ND	0.50	"	"	"	"	"	"
Bromomethane	ND	0.50	"	"	"	"	"	"
Chloroethane	ND	0.50	"	"	"	"	"	"
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"
Freon 113	ND	5.0	"	"	"	"	"	"
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"
Methylene chloride	ND	0.50	"	"	"	"	"	"
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"
Methyl tert-butyl ether (MTBE)	ND	2.0	"	"	"	"	"	"
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"
2-Butanone	ND	5.0	"	"	"	"	"	"
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"
Bromochloromethane	ND	0.50	"	"	"	"	"	"
Chloroform	ND	0.50	"	"	"	"	"	"
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"
Benzene	ND	0.50	"	"	"	"	"	"
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"
Trichloroethene	ND	0.50	"	"	"	"	"	"
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"
Dibromomethane	ND	0.50	"	"	"	"	"	"
Bromodichloromethane	ND	0.50	"	"	"	"	"	"
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"
4-Methyl-2-pentanone	ND	5.0	"	"	"	"	"	"

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW5
1205992-01 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Volatile Organic Compounds by EPA Method 524.2

2-Chloroethyl vinyl ether	ND	1.0	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2	
Toluene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
2-Hexanone	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
n,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
m-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
p-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
o-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Xylenes, Total	ND	0.50	"	"	"	"	"	"	

Oilfield Environmental and Compliance

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW5
1205992-01 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
---------	--------	--------------------	-------	----------	-------	----------	----------	--------	-------

Weck Laboratories, Inc

Volatile Organic Compounds by EPA Method 524.2

1,3-Dichloropropene, Total	ND	0.50	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2	
THMs, Total	ND	2.0	"	"	"	"	"	"	"

Surrogate: 1,2-Dichlorobenzene-d4		106 %	70-130		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	70-130		"	"	"	"	

Oilfield Environmental and Compliance

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TEL: (805) 922-4772
FAX: (805) 925-3376



Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW6
1205992-02 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Anions by IC, EPA Method 300.0/300.1/326

Chloride, Total	73	5.0	mg/l	10	W2K1390	30-Nov-12	30-Nov-12	EPA 300.0	
Fluoride, Total	0.28	0.10	"	1	"	"	30-Nov-12	"	
Nitrite as N	ND	150	ug/l	"	"	"	"	"	
Nitrate as NO3	ND	0.50	mg/l	"	"	"	"	"	
Sulfate as SO4	49	5.0	"	10	"	"	30-Nov-12	"	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Alkalinity as CaCO3	150	10	mg/l	1	W2L0009	03-Dec-12	03-Dec-12	SM 2320B	
Carbonate Alkalinity as CaCO3	ND	2.0	"	"	"	"	"	"	
Bicarbonate Alkalinity as HCO3	190	10	"	"	"	"	"	"	
Hydroxide Alkalinity as CaCO3	ND	2.0	"	"	"	"	"	"	
Color	ND	3.0	Color Units	"	W2K1404	30-Nov-12	30-Nov-12	SM 2120B	
Specific Conductance (EC)	490	2.0	umhos/cm	"	W2L0149	05-Dec-12	05-Dec-12	SM 2510B	
MBAS	ND	0.050	mg/l	"	W2K1397	30-Nov-12	30-Nov-12	SM 5540C	
Threshold Odor Number	1.0	1.0	T.O.N.	"	W2K1405	30-Nov-12	30-Nov-12	EPA 140.1	O-07
pH	7.88	0.10	Units	"	W2K1406	30-Nov-12	30-Nov-12	SM 4500H+-B	*
Total Dissolved Solids	330	10	mg/l	"	W2L0043	03-Dec-12	05-Dec-12	SM 2540C	
Turbidity	0.58	0.10	NTU	"	W2K1401	30-Nov-12	30-Nov-12	EPA 180.1	

Metals by EPA 200 Series Methods

Calcium, Total	60.8	0.100	mg/l	1	W2L0020	03-Dec-12	04-Dec-12	EPA 200.7	
Magnesium, Total	3.59	0.100	"	"	"	"	"	"	
Silver, Total	ND	0.20	ug/l	"	W2L0023	03-Dec-12	06-Dec-12	EPA 200.8	
Aluminum, Total	ND	5.0	"	"	"	"	"	"	
Arsenic, Total	0.60	0.40	"	"	"	"	"	"	
Barium, Total	50	0.50	"	"	"	"	"	"	
Beryllium, Total	ND	0.10	"	"	"	"	"	"	
Calcium, Total	59	0.50	mg/l	5	"	"	06-Dec-12	"	
Cadmium, Total	ND	0.10	ug/l	1	"	"	06-Dec-12	"	
Chromium, Total	0.38	0.20	"	"	"	"	"	"	
Copper, Total	0.91	0.50	"	"	"	"	"	"	
Iron, Total	150	20	"	"	"	"	"	"	
Potassium, Total	1.5	0.10	mg/l	"	"	"	"	"	
Magnesium, Total	3.5	0.10	"	"	"	"	"	"	
Manganese, Total	18	0.20	ug/l	"	"	"	"	"	
Sodium, Total	30	0.10	mg/l	"	"	"	"	"	
Nickel, Total	2.3	0.80	ug/l	"	"	"	"	"	

Oilfield Environmental and Compliance

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW6
1205992-02 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Metals by EPA 200 Series Methods

Lead, Total	ND	0.20	ug/l	1	W2L0023	03-Dec-12	06-Dec-12	EPA 200.8	
Selenium, Total	ND	0.40	"	"	"	"	"	"	
Thallium, Total	ND	0.20	"	"	"	"	"	"	
Zinc, Total	ND	5.0	"	"	"	"	"	"	
Hardness as CaCO ₃ , Total	167	0.662	mg/l	"	[CALC]	03-Dec-12	04-Dec-12	EPA 200.7	
Mercury, Total	ND	0.050	ug/l	"	W2L0131	04-Dec-12	06-Dec-12	EPA 245.1	

Semivolatile Organic Compounds by GC/MS

Benzo (a) pyrene	ND	0.10	ug/l	1	W2L0018	03-Dec-12	04-Dec-12	EPA 525.2	
Bis(2-ethylhexyl)adipate	ND	5.0	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	12	3.0	"	"	"	"	"	"	
Alachlor	ND	0.10	"	"	"	"	"	"	
Atrazine	ND	0.10	"	"	"	"	"	"	
Bromacil	ND	0.50	"	"	"	"	"	"	
Butachlor	ND	0.10	"	"	"	"	"	"	
Captan	ND	1.0	"	"	"	"	"	"	
Chloropropham	ND	0.10	"	"	"	"	"	"	
Cyanazine	ND	0.10	"	"	"	"	"	"	
Diazinon	ND	0.10	"	"	"	"	"	"	
Dimethoate	ND	0.20	"	"	"	"	"	"	
Diphenamid	ND	0.10	"	"	"	"	"	"	
Disulfoton	ND	0.10	"	"	"	"	"	"	
EPTC	ND	0.10	"	"	"	"	"	"	
Metolachlor	ND	0.10	"	"	"	"	"	"	
Metribuzin	ND	0.10	"	"	"	"	"	"	
Molinate	ND	0.10	"	"	"	"	"	"	
Prometon	ND	0.10	"	"	"	"	"	"	
Prometryn	ND	0.10	"	"	"	"	"	"	
Simazine	ND	0.10	"	"	"	"	"	"	
Terbacil	ND	2.0	"	"	"	"	"	"	
Thiobencarb	ND	0.10	"	"	"	"	"	"	
Trithion	ND	0.10	"	"	"	"	"	"	

Surrogate: 1,3-Dimethyl-2-nitrobenzene	99 %	73-136	"	"	"	"	"
Surrogate: Perylene-d12	94 %	48-141	"	"	"	"	"
Surrogate: Triphenyl phosphate	89 %	71-150	"	"	"	"	"

Oilfield Environmental and Compliance

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6085 Cat Canyon Road
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Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW6
1205992-02 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Volatile Organic Compounds by EPA Method 524.2

Dichlorodifluoromethane (Freon 12)	ND	0.50	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Freon 113	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	2.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
2-Butanone	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Benzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.0	"	"	"	"	"	"	
2-Chloroethyl vinyl ether	ND	1.0	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	

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6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW6
1205992-02 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Volatile Organic Compounds by EPA Method 524.2

1,3-Dichloropropane	ND	0.50	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
2-Hexanone	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
m-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
p-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
o-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Xylenes, Total	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropene, Total	ND	0.50	"	"	"	"	"	"	
THMs, Total	ND	2.0	"	"	"	"	"	"	

Surrogate: 1,2-Dichlorobenzene-d4

107 % 70-130

" " " "

Surrogate: 4-Bromofluorobenzene

102 % 70-130

" " " "

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ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well FW6
1205992-02 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Oilfield Environmental and Compliance

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well GWP4
1205992-03 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Anions by IC, EPA Method 300.0/300.1/326

Chloride, Total	74	5.0	mg/l	10	W2K1390	30-Nov-12	30-Nov-12	EPA 300.0	
Fluoride, Total	0.34	0.10	"	1	"	"	30-Nov-12	"	
Nitrite as N	ND	150	ug/l	"	"	"	"	"	
Nitrate as NO3	ND	0.50	mg/l	"	"	"	"	"	
Sulfate as SO4	160	5.0	"	10	"	"	30-Nov-12	"	

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Alkalinity as CaCO3	190	10	mg/l	1	W2L0009	03-Dec-12	03-Dec-12	SM 2320B	
Carbonate Alkalinity as CaCO3	ND	2.0	"	"	"	"	"	"	
Bicarbonate Alkalinity as HCO3	230	10	"	"	"	"	"	"	
Hydroxide Alkalinity as CaCO3	ND	2.0	"	"	"	"	"	"	
Color	ND	3.0	Color Units	"	W2K1404	30-Nov-12	30-Nov-12	SM 2120B	
Specific Conductance (EC)	860	2.0	umhos/cm	"	W2L0149	05-Dec-12	05-Dec-12	SM 2510B	
MBAS	ND	0.050	mg/l	"	W2K1397	30-Nov-12	30-Nov-12	SM 5540C	
Threshold Odor Number	2.0	1.0	T.O.N.	"	W2K1405	30-Nov-12	30-Nov-12	EPA 140.1	O-07
pH	8.00	0.10	Units	"	W2K1406	30-Nov-12	30-Nov-12	SM 4500H+-B	*
Total Dissolved Solids	550	10	mg/l	"	W2L0043	03-Dec-12	05-Dec-12	SM 2540C	
Turbidity	9.2	0.10	NTU	"	W2K1401	30-Nov-12	30-Nov-12	EPA 180.1	

Metals by EPA 200 Series Methods

Calcium, Total	105	0.100	mg/l	1	W2L0020	03-Dec-12	04-Dec-12	EPA 200.7	
Magnesium, Total	20.9	0.100	"	"	"	"	"	"	
Silver, Total	ND	0.20	ug/l	"	W2L0023	03-Dec-12	06-Dec-12	EPA 200.8	
Aluminum, Total	5.0	5.0	"	"	"	"	"	"	
Arsenic, Total	ND	0.40	"	"	"	"	"	"	
Barium, Total	67	0.50	"	"	"	"	"	"	
Beryllium, Total	ND	0.10	"	"	"	"	"	"	
Calcium, Total	100	1.0	mg/l	10	"	"	06-Dec-12	"	
Cadmium, Total	ND	0.10	ug/l	1	"	"	06-Dec-12	"	
Chromium, Total	ND	0.20	"	"	"	"	"	"	
Copper, Total	ND	0.50	"	"	"	"	"	"	
Iron, Total	1700	20	"	"	"	"	"	"	
Potassium, Total	2.9	0.10	mg/l	"	"	"	"	"	
Magnesium, Total	19	0.10	"	"	"	"	"	"	
Manganese, Total	90	0.20	ug/l	"	"	"	"	"	
Sodium, Total	38	0.10	mg/l	"	"	"	"	"	
Nickel, Total	ND	0.80	ug/l	"	"	"	"	"	

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ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well GWP4
1205992-03 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Metals by EPA 200 Series Methods

Lead, Total	ND	0.20	ug/l	1	W2L0023	03-Dec-12	06-Dec-12	EPA 200.8	
Selenium, Total	ND	0.40	"	"	"	"	"	"	
Thallium, Total	ND	0.20	"	"	"	"	"	"	
Zinc, Total	180	5.0	"	"	"	"	"	"	
Hardness as CaCO3, Total	348	0.662	mg/l	"	[CALC]	03-Dec-12	04-Dec-12	EPA 200.7	
Mercury, Total	ND	0.050	ug/l	"	W2L0131	04-Dec-12	06-Dec-12	EPA 245.1	

Semivolatile Organic Compounds by GC/MS

Benzo (a) pyrene	ND	0.10	ug/l	1	W2L0018	03-Dec-12	04-Dec-12	EPA 525.2	
Bis(2-ethylhexyl)adipate	ND	5.0	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	3.0	"	"	"	"	"	"	
Alachlor	ND	0.10	"	"	"	"	"	"	
Atrazine	ND	0.10	"	"	"	"	"	"	
Bromacil	ND	0.50	"	"	"	"	"	"	
Butachlor	ND	0.10	"	"	"	"	"	"	
Captan	ND	1.0	"	"	"	"	"	"	
Chloropropham	ND	0.10	"	"	"	"	"	"	
Cyanazine	ND	0.10	"	"	"	"	"	"	
Diazinon	ND	0.10	"	"	"	"	"	"	
Dimethoate	ND	0.20	"	"	"	"	"	"	
Diphenamid	ND	0.10	"	"	"	"	"	"	
Disulfoton	ND	0.10	"	"	"	"	"	"	
EPTC	ND	0.10	"	"	"	"	"	"	
Metolachlor	ND	0.10	"	"	"	"	"	"	
Metribuzin	ND	0.10	"	"	"	"	"	"	
Molinate	ND	0.10	"	"	"	"	"	"	
Prometon	ND	0.10	"	"	"	"	"	"	
Prometryn	ND	0.10	"	"	"	"	"	"	
Simazine	ND	0.10	"	"	"	"	"	"	
Terbacil	ND	2.0	"	"	"	"	"	"	
Thiobencarb	ND	0.10	"	"	"	"	"	"	
Trithion	ND	0.10	"	"	"	"	"	"	

Surrogate: 1,3-Dimethyl-2-nitrobenzene	175 %	73-136	"	"	"	"	"	S-GC
Surrogate: Perylene-d12	89 %	48-141	"	"	"	"	"	
Surrogate: Triphenyl phosphate	94 %	71-150	"	"	"	"	"	

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ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well GWP4
1205992-03 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Volatile Organic Compounds by EPA Method 524.2

Dichlorodifluoromethane (Freon 12)	ND	0.50	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Freon 113	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	2.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
2-Butanone	ND	5.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
Bromochloromethane	ND	0.50	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Benzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
Dibromomethane	ND	0.50	"	"	"	"	"	"	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	5.0	"	"	"	"	"	"	
2-Chloroethyl vinyl ether	ND	1.0	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	

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FAX: (805) 925-3376



Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well GWP4
1205992-03 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Weck Laboratories, Inc

Volatile Organic Compounds by EPA Method 524.2

1,3-Dichloropropane	ND	0.50	ug/l	1	W2K1393	30-Nov-12	30-Nov-12	EPA 524.2	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
2-Hexanone	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	0.50	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Styrene	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Isopropylbenzene	ND	0.50	"	"	"	"	"	"	
Bromobenzene	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.50	"	"	"	"	"	"	
n-Propylbenzene	ND	0.50	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.50	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.50	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.50	"	"	"	"	"	"	
m-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.50	"	"	"	"	"	"	
p-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
o-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
n-Butylbenzene	ND	0.50	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.50	"	"	"	"	"	"	
Naphthalene	ND	0.50	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.50	"	"	"	"	"	"	
Xylenes, Total	ND	0.50	"	"	"	"	"	"	
1,3-Dichloropropene, Total	ND	0.50	"	"	"	"	"	"	
THMs, Total	ND	2.0	"	"	"	"	"	"	

Surrogate: 1,2-Dichlorobenzene-d4

108 % 70-130

" " " "

Surrogate: 4-Bromofluorobenzene

103 % 70-130

" " " "

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ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Well GWP4
1205992-03 (Drinking Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Exhibit 14
Sisquoc Groundwater Analysis

ERG
6085 Cat Canyon Rd
Santa Maria, CA 93454

Laboratory No: 1108003-02
Date Received: 8/1/2011
Date Reported: 8/23/2011

Attention: Steve Horner

Sample Identification: ERG-Cat Canyon Williams Holding WW Discharge Pumps
Sampled by: Dave Smith Date: 7/27/2011 Time:
Report Notes:

COMPLETE GEOCHEM ANALYSIS

pH.....	7.50	Specific Gravity @ 60 F...	1.008
Electrical Conductivity (EC)..... (millimhos/cm @ 25 C)	13.2	Resistivity..... (ohm meters @ 25 C)	0.7605

Constituents	mg/L	meq/L	Reacting %
Calcium, Ca	51	2.5	1.02
Magnesium, Mg	30	2.5	0.99
Sodium, Na	2500	110	43.73
Potassium, K	44	1.1	0.45
Iron, Fe (total)	1.5	0.081	0.03
Alkalinity as:			
Hydroxide, OH	0.0	0	0
Carbonate, CO3	0.0	0	0
Bicarbonate, HCO3	1800	29	11.58
Chloride, Cl	3700	100	41.95
Sulfate, SO4	16	0.33	0.13
Sulfide, S	4.3		
Boron, B	36		
Barium, Ba	< 1.0		
Silica, SiO2	79		
Strontium, Sr	3.5		
Totals (Sum)	7350	246	100

Total Dissolved Solids, (Gravimetric)	8500
Calculated Hardness, CaCO3	250
Total Alkalinity, CaCO3	1800
Sodium Chloride, (total)	7200

Primary Salinity	84.16
Secondary Salinity	0
Total Salinity	84.16

Cation/Anion Balance, %	8.0%
Sodium, Na (Calculated), mg/L	2931.81
Langelier Scale Index	1.1
Stiff/Davis Stability Index	1.07

Primary Alkalinity	4.2
Secondary Alkalinity	4.02
Total Alkalinity	8.22


Laboratory Authorization



Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Recruit Well 821
1205992-05 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Oilfield Environmental and Compliance

Wet Chemistry by EPA or APHA Standard Methods

pH @ 20 C	7.9	0.10	pH Units	1	A212055	04-Dec-12	04-Dec-12	EPA 9040B/SM4500H+ B	HT-pH
Total Alkalinity, CaCO3	3000	100	mg/L	10	A212090	05-Dec-12	05-Dec-12	SM 2320B	
Bicarbonate, CaCO3	3000	100	"	"	"	"	"	"	
Carbonate, CaCO3	ND	100	"	"	"	"	"	"	
Hydroxide, CaCO3	ND	100	"	"	"	"	"	"	
Ammonia as NH3	69	0.12	"	1	A212100	05-Dec-12	05-Dec-12	SM4500 NH3D	
Specific Conductance (EC) @ 20 C	11000	20	umhos/cm	10	A212033	30-Nov-12	30-Nov-12	2510 B	
Total Oil & Grease	74	5.0	mg/L	1	A212102	05-Dec-12	06-Dec-12	EPA 1664	
Resistivity @ 20 C	87	2.0	Ohm-cm	"	A212033	30-Nov-12	30-Nov-12	SM2510B	
Total Dissolved Solids	7800	10	mg/L	"	A212135	06-Dec-12	06-Dec-12	2540C	

Anions by EPA Method 300.0

Bromide	9.8	2.0	mg/L	5	A211661	29-Nov-12	30-Nov-12	EPA 300.0	
Chloride	1600	200	"	500	"	"	30-Nov-12	"	
Fluoride	ND	2.0	"	5	"	"	30-Nov-12	"	R-06
Nitrate as NO3	ND	9.0	"	"	"	"	"	"	R-06
Nitrite as NO2	ND	6.6	"	"	"	"	"	"	R-06
Sulfate	ND	2.0	"	"	"	"	"	"	R-06

Total Metals by EPA 6000/7000 Series Methods

Barium	ND	0.25	mg/L	1	A211711	30-Nov-12	04-Dec-12	EPA 6010B	
Boron	21	0.25	"	"	"	"	"	"	
Calcium	24	1.0	"	"	"	"	"	"	
Hardness as CaCO3	26	10	"	"	A212088	05-Dec-12	05-Dec-12	Calculation	
Iron	1.1	0.12	"	"	A211711	30-Nov-12	04-Dec-12	EPA 6010B	
Lithium	0.91	0.12	"	"	"	"	"	"	
Magnesium	17	0.12	"	"	"	"	"	"	
Manganese	ND	0.025	"	"	"	"	"	"	
Potassium	30	5.0	"	"	"	"	"	"	
Silica (SiO2)	51	0.54	"	"	"	"	"	"	
Sodium	2300	50	"	100	"	"	05-Dec-12	"	
Strontium	1.9	0.025	"	1	"	"	04-Dec-12	"	
Zinc	ND	0.50	"	"	"	"	"	"	

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Recruit Well 821
1205992-05 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Volatile Organic Compounds by EPA Method 624

R-06

Benzene	710	25	ug/L	50	A212089	05-Dec-12	05-Dec-12	EPA 624
Bromodichloromethane	ND	25	"	"	"	"	"	"
Bromoform	ND	25	"	"	"	"	"	"
Bromomethane	ND	25	"	"	"	"	"	"
Carbon tetrachloride	ND	25	"	"	"	"	"	"
Chlorobenzene	ND	25	"	"	"	"	"	"
Chloroethane	ND	25	"	"	"	"	"	"
2-Chloroethyl vinyl ether	ND	50	"	"	"	"	"	"
Chloroform	ND	25	"	"	"	"	"	"
Chloromethane	ND	25	"	"	"	"	"	"
Dibromochloromethane	ND	25	"	"	"	"	"	"
1,2-Dichlorobenzene	ND	25	"	"	"	"	"	"
1,3-Dichlorobenzene	ND	25	"	"	"	"	"	"
1,4-Dichlorobenzene	ND	25	"	"	"	"	"	"
1,1-Dichloroethane	ND	25	"	"	"	"	"	"
1,2-Dichloroethane	ND	25	"	"	"	"	"	"
1,1-Dichloroethene	ND	25	"	"	"	"	"	"
trans-1,2-Dichloroethene	ND	25	"	"	"	"	"	"
1,2-Dichloropropane	ND	25	"	"	"	"	"	"
cis-1,3-Dichloropropene	ND	25	"	"	"	"	"	"
trans-1,3-Dichloropropene	ND	25	"	"	"	"	"	"
Ethylbenzene	74	25	"	"	"	"	"	"
Methylene chloride	ND	50	"	"	"	"	"	"
1,1,2,2-Tetrachloroethane	ND	25	"	"	"	"	"	"
Tetrachloroethene (PCE)	ND	25	"	"	"	"	"	"
Toluene	870	25	"	"	"	"	"	"
1,1,1-Trichloroethane	ND	25	"	"	"	"	"	"
1,1,2-Trichloroethane	ND	25	"	"	"	"	"	"
Trichloroethene (TCE)	ND	25	"	"	"	"	"	"
Trichlorofluoromethane	ND	25	"	"	"	"	"	"
Vinyl chloride	ND	25	"	"	"	"	"	"

Surrogate: Dibromofluoromethane	112 %	70-130	"	"	"	"
Surrogate: Toluene-d8	108 %	70-130	"	"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	70-130	"	"	"	"

Oilfield Environmental and Compliance

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon Drinking Water Testing
Project Number: [none]
Project Manager: Phil Hosch

Reported:
10-Dec-12 13:11

Recruit Well 821
1205992-05 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Oilfield Environmental and Compliance

Semivolatile Organic Compounds by EPA Method 625

R-01

Acenaphthene	ND	100	ug/L	5	A212137	06-Dec-12	07-Dec-12	EPA 625	
Acenaphthylene	ND	100	"	"	"	"	"	"	
Anthracene	ND	100	"	"	"	"	"	"	
Benz(a)anthracene	ND	100	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	100	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	100	"	"	"	"	"	"	
Benzo (a) pyrene	ND	100	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	100	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	52	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	100	"	"	"	"	"	"	
Bis(2-chloroisopropyl) ether	ND	100	"	"	"	"	"	"	
Bis(2-ethylhexyl) phthalate	ND	52	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	100	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	100	"	"	"	"	"	"	
2-Chloronaphthalene	ND	100	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	52	"	"	"	"	"	"	
Chrysene	ND	100	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	100	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	100	"	"	"	"	"	"	
3,3'-Dichlorobenzidine	ND	52	"	"	"	"	"	"	
Diethyl phthalate	ND	100	"	"	"	"	"	"	
Dimethyl phthalate	ND	100	"	"	"	"	"	"	
2,4-Dinitrotoluene	ND	52	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	52	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	100	"	"	"	"	"	"	
Fluoranthene	ND	100	"	"	"	"	"	"	
Fluorene	ND	100	"	"	"	"	"	"	
Hexachlorobenzene	ND	100	"	"	"	"	"	"	
Hexachlorobutadiene	ND	100	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	52	"	"	"	"	"	"	
Hexachloroethane	ND	100	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	100	"	"	"	"	"	"	
Isophorone	ND	100	"	"	"	"	"	"	

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon
Project Number: GWP Level 4 Produced water to Recruit W.W. Tk
Project Manager: Phil Hosch

Reported:
13-Sep-12 08:29

**GWP Level 4 Produced Water to Recruit W.W. Tk
1204257-01 (Water)**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Oilfield Environmental and Compliance

Wet Chemistry by EPA or APHA Standard Methods

pH @ 20 C	8.0	0.10	pH Units	1	A208685	30-Aug-12	30-Aug-12	EPA 9040B/SM45 00H+ B	HT-pH
Total Alkalinity, CaCO ₃	2000	100	mg/L	10	A208604	28-Aug-12	28-Aug-12	SM 2320B	
Bicarbonate, CaCO ₃	2000	100	"	"	"	"	"	"	
Carbonate, CaCO ₃	ND	100	"	"	"	"	"	"	
Hydroxide, CaCO ₃	ND	100	"	"	"	"	"	"	
Specific Conductance (EC) @ 20 C	14000	20	umhos/cm	"	A208620	28-Aug-12	28-Aug-12	2510 B	
Resistivity @ 20 C	70	2.0	Ohm-cm	1	"	"	"	SM2510B	
Total Dissolved Solids	10000	10	mg/L	"	A208637	29-Aug-12	29-Aug-12	2540C	
Total Suspended Solids	26	10	"	"	A208681	30-Aug-12	30-Aug-12	2540 D	

Anions by EPA Method 300.0

Bromide	20	0.40	mg/L	1	A208595	27-Aug-12	28-Aug-12	EPA 300.0	
Chloride	3100	200	"	500	"	"	28-Aug-12	"	
Fluoride	ND	0.40	"	1	"	"	28-Aug-12	"	
Nitrate as NO ₃	ND	1.8	"	"	"	"	"	"	
Nitrite as NO ₂	ND	1.3	"	"	"	"	"	"	
Sulfate	25	0.40	"	"	"	"	"	"	

Total Metals by EPA 6000/7000 Series Methods

Barium	0.68	0.050	mg/L	1	A208684	30-Aug-12	31-Aug-12	EPA 6010B	
Boron	22	0.050	"	"	"	"	04-Sep-12	"	
Calcium	42	4.0	"	20	"	"	31-Aug-12	"	
Hardness as CaCO ₃	190	10	"	1	A209023	04-Sep-12	04-Sep-12	Calculation	
Iron	0.61	0.025	"	"	A208684	30-Aug-12	31-Aug-12	EPA 6010B	
Lithium	1.0	0.025	"	"	"	"	"	"	
Magnesium	21	0.025	"	"	"	"	"	"	
Manganese	0.058	0.025	"	5	"	"	06-Sep-12	"	B-06
Potassium	43	5.0	"	"	"	"	04-Sep-12	"	
Silica (SiO ₂)	59	0.11	"	1	"	"	31-Aug-12	"	
Sodium	2200	200	"	2000	"	"	04-Sep-12	"	
Strontium	2.2	0.0050	"	1	"	"	31-Aug-12	"	
Zinc	ND	0.10	"	"	"	"	"	"	

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Oilfield Environmental and Compliance, INC.

ERG Operating Company, LLC
6085 Cat Canyon Road
Santa Maria CA, 93454

Project: Cat Canyon
Project Number: GWP Level 4 Produced water to Recruit W.W. Tk
Project Manager: Phil Hosch

Reported:
13-Sep-12 08:29

**GWP Level 4 Produced Water to Recruit W.W. Tk
1204257-01 (Water)**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Oilfield Environmental and Compliance

Miscellaneous Physical/Conventional Chemistry Parameters

Total Oil & Grease	370	50	mg/L	5	A208674	30-Aug-12	30-Aug-12	WILKS	
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Oilfield Environmental and Compliance

307 Roemer Way, Suite 300, Santa Maria, CA 93454

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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**TEL: (805) 922-4772
FAX: (805) 925-3376**



Exhibit 15

Treated Steam Water Supply Analysis

ERG Resources, LLC
Soft Water Plant
Revision A
By: DAS

T.J. Cross Engineers, Inc.
Job #: 12025
DS-12025-24
April 17, 2005

Softener Inlet /Softener Outlet Water Analysis

	Softener Inlet ppm		Softener Outlet Outlet ppm	
	as ion	as CaCO3	as ion	as CaCO3
<u>Cations</u>				
Ca	51.0	127.5	0	0
Mg	30.0	123.5	0	0
Na	2500.0	5434.8	2649.6	5760.0
K	44.0	56.3	0.0	0
Fe	1.5	4.0	0.0	0
Sr	3.5	14.0	0.0	0
Ba	0.0	0.0	0.0	0
Sum		5760.0		
<u>Anions</u>				
HCO3	1800.0	1475.4	1800.0	1475.4
Cl	3700.0	5217.0	3700.0	5217.0
SO4	16.0	16.6	16.0	16.6
S	4.3	13.4	4.3	13.4
B	36.0	499.5	36.0	499.5
Sum		7222.0		
SiO2	79.0	65.7	79.0	65.7

	Softener Inlet	Softener Outlet
Total Hardness (as CaCO3), ppm	250	< 0.5
Free Oil Content, ppm	10	< 0.5
Total Suspended Solids, ppm	10	< 0.2



Exhibit 16

Map of Water Suppliers in Santa Barbara County

WATER SOURCES AND DISTRIBUTION IN SANTA BARBARA COUNTY



Department of Public Works
County of Santa Barbara

Legend

- Dams
- SWP Turnout
- City Boundary Line
- State Water Project Pipeline
- Rivers
- South Coast Conduit
- Tunnel
- Roads
- Highways Freeways
- Groundwater Basins
- Lakes & Reservoirs
- Casmalia CSD
- City of Santa Barbara Water Service Area
- County boundary
- Santa Maria
- Vandenberg Air Force Base
- La Cumbre Mutual Water Co
- Goleta WD
- Buellton
- Carpinteria Valley WD
- Cuyama CSD
- Guadalupe
- Lompoc
- Los Alamos CSD
- Mission Hills CSD
- Montecito WD
- Vandenberg Village CSD
- Golden State Water Co (GSWC)
- Solvang
- Santa Ynez R WCD IDI
- Pacific Ocean

This map is for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the database may be reflected on this map. Santa Barbara County shall not be liable for any errors, omissions, or damages that result from inappropriate use of this document. No level of accuracy is claimed for the boundary lines shown herein and lines should not be used to obtain coordinate values, bearings or distances.



Miles
0 0.5 1 2 3 4
Coordinate System: State Plane California Zone V NAD 1983

WATER SOURCES AND DISTRIBUTION IN SANTA BARBARA COUNTY

Santa Barbara County, California



Compiled by the Public Works Enterprise GIS on October 2012

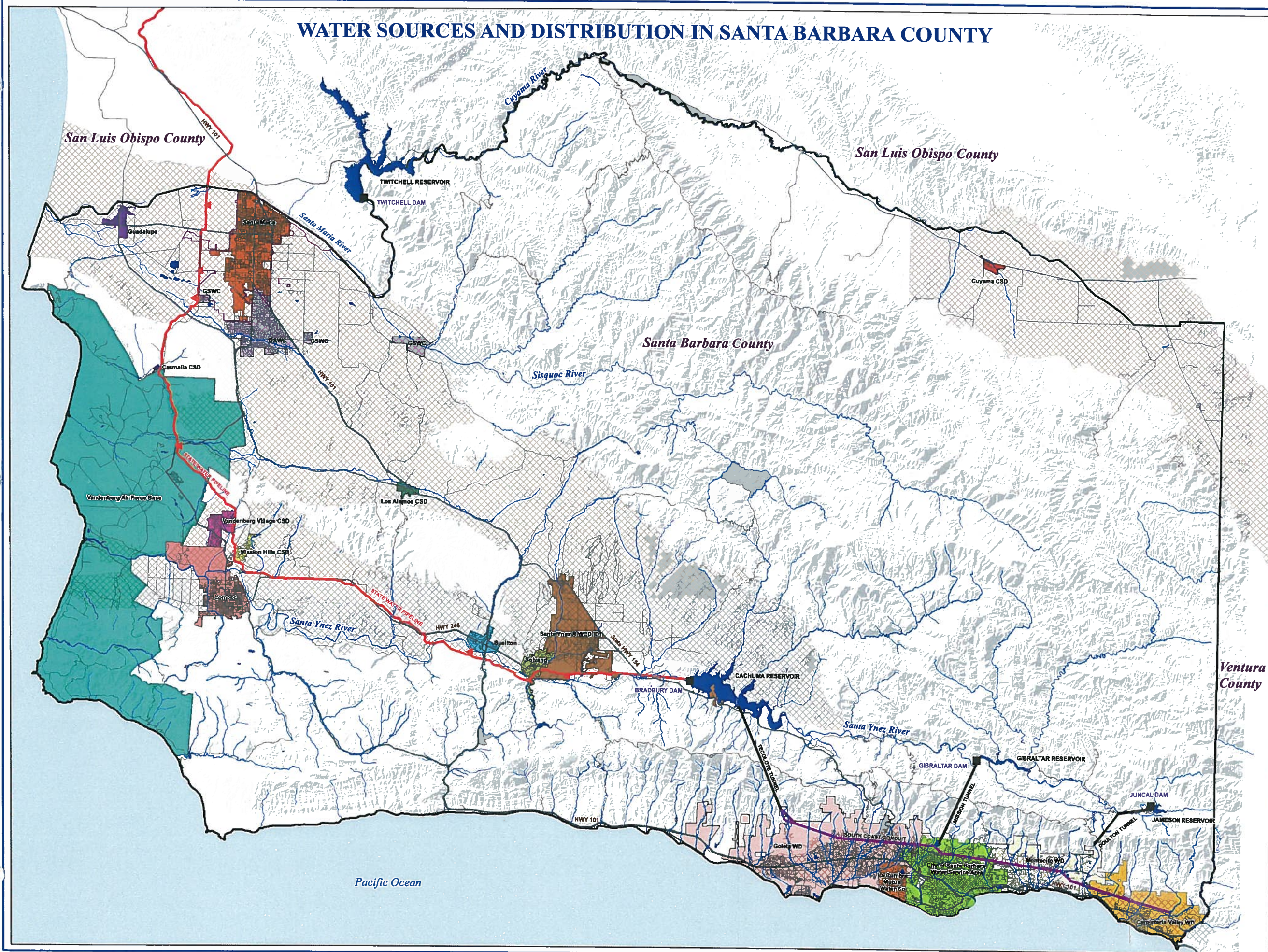




Exhibit 17

Historic & Existing Oil Producing Wells Map



Exhibit 18

Completion Information for Historic & Existing Oil Producing Wells

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	API Number	Well Symbol	County Name	Lease Name	Well Number	Operator Name	Section	Township	Range	Base Meridian	Lat83	Long83	Year Drilled	Year Abandoned
61	08320075	DH	Santa Barbara	Union Fee	F88	Home-Sake Prod Co	19	9N	32W	SB	34.843497	-120.28928	1968	1972
62	08320078	AB	Santa Barbara	Recruit Fee	402-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831775	-120.30473	1967	1975
63	08320084	AB	Santa Barbara	Williams Holding	58-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822451	-120.30277	1968	1999
64	08320156	AB	Santa Barbara	Recruit Fee	32-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.832719	-120.30796	1968	N/A
65	08320183	AB	Santa Barbara	Williams Holding	G78	Home-Sake Prod Co	32	9N	32W	SB	34.81558	-120.27088	1969	1974
66	08320220	AP	Santa Barbara	G.W.P.	42-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.847472	-120.30521	1969	N/A
67	08320221	DH	Santa Barbara	G.W.P.	43-13	ERG Operating Company L.L.C.	13	9N	33W	SB	34.860137	-120.30478	1969	N/A
68	08320227	AB	Santa Barbara	G.W.P.	43A-13	ERG Operating Company L.L.C.	13	9N	33W	SB	34.859959	-120.30477	1969	2001
69	08320251	AP	Santa Barbara	G.W.P.	64A-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.843817	-120.30027	1970	N/A
70	08320270	AP	Santa Barbara	Williams Holding	75-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827465	-120.2985	1970	N/A
71	08320366	AB	Santa Barbara	Los Alamos	108	ERG Operating Company L.L.C.	36	9N	33W	SB	34.813734	-120.3045	1970	1974
72	08320381	AP	Santa Barbara	G.W.P.	11A-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.849474	-120.31195	1971	N/A
73	08320400	AP	Santa Barbara	Los Alamos	96	ERG Operating Company L.L.C.	36	9N	33W	SB	34.814572	-120.30512	1971	N/A
74	08320401	AB	Santa Barbara	Los Alamos	102	ERG Operating Company L.L.C.	31	9N	32W	SB	34.808321	-120.2867	1971	1992
75	08320442	AB	Santa Barbara	McNee	13	Conoco Inc.	20	9N	32W	SB	34.835884	-120.27485	1972	1980
76	08320624	AP	Santa Barbara	Williams Holding	17-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823883	-120.31073	1974	N/A
77	08320644	AP	Santa Barbara	Williams Holding	26-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825777	-120.30974	1974	N/A
78	08320647	AP	Santa Barbara	Williams Holding	35-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.82772	-120.30737	1974	N/A
79	08320668	DH	Santa Barbara	Williams Holding	56-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825642	-120.30285	1974	1999
80	08320669	AP	Santa Barbara	Williams Holding	77-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823926	-120.29861	1974	N/A
81	08320683	AB	Santa Barbara	Williams Holding	56A-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825561	-120.30289	1974	1999
82	08320695	AP	Santa Barbara	Bell	172	Greka Oil & Gas, Inc.	26	9N	33W	SB	34.824607	-120.31312	1974	N/A
83	08320704	AP	Santa Barbara	Williams Holding	25-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827629	-120.30964	1974	N/A
84	08320705	AB	Santa Barbara	Williams Holding	36-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826266	-120.30664	1975	N/A
85	08320716	AP	Santa Barbara	Williams Holding	205-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827022	-120.30849	1974	N/A
86	08320717	AB	Santa Barbara	Bonetti	F16B	Aera Energy LLC	19	9N	32W	SB	34.836059	-120.28903	1975	2001
87	08320723	AP	Santa Barbara	Williams Holding	37-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824323	-120.30678	1975	N/A
88	08320724	AP	Santa Barbara	Pyramid-OT	32X	Pyramid Oil Co.	23	9N	33W	SB	34.847457	-120.32506	1975	N/A
89	08320736	AP	Santa Barbara	Recruit Fee	44-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.829383	-120.30506	1975	N/A
90	08320740	AP	Santa Barbara	Williams Holding	46-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825748	-120.30513	1975	N/A
91	08320776	AP	Santa Barbara	Williams Fee	63-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.816885	-120.30087	1975	N/A
92	08320808	AP	Santa Barbara	Williams Holding	105-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824908	-120.31075	1975	N/A
93	08320816	AP	Santa Barbara	Williams Holding	402A-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825863	-120.31076	1975	N/A
94	08320819	AP	Santa Barbara	WH-RF	206-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831914	-120.30439	1975	N/A
95	08320818	AP	Santa Barbara	Williams Holding	305-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824809	-120.30808	1975	N/A
96	08320820	AP	Santa Barbara	Williams Holding	204-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826118	-120.30668	1975	N/A
97	08320821	AP	Santa Barbara	WH-RF	825-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827618	-120.30723	1975	N/A
98	08320835	AP	Santa Barbara	Williams Holding	825-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.82703	-120.30832	1975	N/A
99	08320836	AP	Santa Barbara	Williams Holding	825-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826902	-120.3085	1975	N/A
100	08320837	AB	Santa Barbara	Williams Holding	925-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826901	-120.30883	1975	1991
101	08320838	AP	Santa Barbara	Williams Holding	935-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826765	-120.30851	1975	N/A
102	08320855	AP	Santa Barbara	Williams Holding	27-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823448	-120.31025	1975	N/A
103	08320856	AP	Santa Barbara	Williams Holding	107-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823311	-120.3102	1975	N/A
104	08320857	AB	Santa Barbara	Bonetti	F14B	Aera Energy LLC	19	9N	32W	SB	34.837875	-120.28866	1975	2001
105	08320862	AB	Santa Barbara	Fugler	18-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.822145	-120.29404	1975	2003
106	08320868	AB	Santa Barbara	Williams Holding	16-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825775	-120.3119	1975	N/A
107	08320879	AP	Santa Barbara	Williams Holding	28-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822105	-120.3096	1975	N/A
108	08320880	AP	Santa Barbara	Williams Holding	207-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822896	-120.30856	1975	N/A
109	08320881	AP	Santa Barbara	Williams Holding	306-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824205	-120.30699	1975	N/A
110	08320882	AP	Santa Barbara	Williams Holding	17A-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824012	-120.31209	1975	N/A
111	08320885	AP	Santa Barbara	Recruit Fee	33-25	ERG Operating Company L.L.C.	33	9N	33W	SB	34.830891	-120.30687	1975	N/A
112	08320897	AB	Santa Barbara	G.W.P.	22A-13	ERG Operating Company L.L.C.	13	9N	33W	SB	34.861998	-120.30873	1976	2001
113	08320899	AB	Santa Barbara	G.W.P.	35-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.842378	-120.30687	1976	1999
114	08320900	AP	Santa Barbara	G.W.P.	43-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.845749	-120.30519	1976	N/A
115	08320901	AP	Santa Barbara	Recruit Fee	34-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.82935	-120.30736	1976	N/A
116	08320902	AP	Santa Barbara	Recruit Fee	43-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831193	-120.30504	1976	N/A
117	08320917	AB	Santa Barbara	G.W.P.	75-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.842079	-120.29845	1976	2005
118	08320919	AB	Santa Barbara	G.W.P.	44-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.843584	-120.30583	1976	2003
119	08320923	AP	Santa Barbara	Recruit Fee	23-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831206	-120.30956	1976	N/A

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	API Number	Well Symbol	County Name	Lessee Name	Well Number	Operator Name	Section	Township	Range	Base Meridian	Lat83	Long83	Year Drilled	Year Abandoned
120	08320924	AP	Santa Barbara	WH-RF	304-25	ERG Operating Company LLC.	25	9N	33W	SB	34.828471	-120.3061	1976	N/A
121	08320925	AP	Santa Barbara	Williams Fee	601-36	ERG Operating Company LLC.	36	9N	33W	SB	34.819522	-120.2998	1975	N/A
122	08320938	AB	Santa Barbara	G.W.P.	63-24	ERG Operating Company LLC.	24	9N	33W	SB	34.84554	-120.30022	1976	2009
123	08320939	AP	Santa Barbara	Williams Holding	18-25	ERG Operating Company LLC.	25	9N	33W	SB	34.821911	-120.31205	1976	N/A
124	08320947	AB	Santa Barbara	Fugler	28-30	ERG Operating Company LLC.	30	9N	32W	SB	34.822098	-120.29296	1976	2003
125	08320956	AP	Santa Barbara	G.W.P.	33-24	ERG Operating Company LLC.	24	9N	33W	SB	34.845731	-120.30729	1976	2005
126	08320957	AB	Santa Barbara	G.W.P.	52-24	ERG Operating Company LLC.	24	9N	33W	SB	34.847557	-120.30288	1976	2005
127	08320959	AP	Santa Barbara	Williams Holding	38-25	ERG Operating Company LLC.	25	9N	33W	SB	34.822043	-120.30725	1976	N/A
128	08320960	AB	Santa Barbara	Williams Holding	1	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.815302	-120.28057	1977	N/A
129	08320962	AB	Santa Barbara	WH-RF	104-25	ERG Operating Company LLC.	25	9N	33W	SB	34.828486	-120.3106	1976	2005
130	08321002	AB	Santa Barbara	Williams Holding	65-25	ERG Operating Company LLC.	25	9N	33W	SB	34.827785	-120.30103	1976	N/A
131	08321003	AP	Santa Barbara	WH-LA	308	ERG Operating Company LLC.	36	9N	33W	SB	34.820822	-120.30704	1976	N/A
132	08321067	AP	Santa Barbara	Recruit Fee	FW6-25	ERG Operating Company LLC.	25	9N	33W	SB	34.832522	-120.31269	1976	N/A
133	08321006	AP	Santa Barbara	Williams Holding	2	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.816841	-120.28369	1976	N/A
134	08321048	AP	Santa Barbara	Williams B	14	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.815302	-120.28057	1977	N/A
135	08321049	AI	Santa Barbara	Williams Holding	4	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.816492	-120.28179	1977	N/A
136	08321065	AB	Santa Barbara	Gwinn Fee	31-31	ERG Operating Company LLC.	31	9N	32W	SB	34.820329	-120.28964	1977	2003
137	08321066	AB	Santa Barbara	Fugler	27-30	ERG Operating Company LLC.	30	9N	32W	SB	34.823962	-120.29186	1977	2003
138	08321067	AP	Santa Barbara	Williams Holding	45-25	ERG Operating Company LLC.	25	9N	33W	SB	34.82757	-120.30507	1977	N/A
139	08321067	AP	Santa Barbara	Williams Holding	88-25	ERG Operating Company LLC.	25	9N	33W	SB	34.821877	-120.2967	1977	N/A
140	08321069	AP	Santa Barbara	Williams B	15	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.813438	-120.28101	1977	N/A
141	08321070	AP	Santa Barbara	Williams B	16	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.811362	-120.2793	1977	N/A
142	08321071	AB	Santa Barbara	WH-RF	403-25	ERG Operating Company LLC.	25	9N	33W	SB	34.830113	-120.30406	1977	N/A
143	08321081	AB	Santa Barbara	G.W.P.	34-24	ERG Operating Company LLC.	24	9N	33W	SB	34.843978	-120.30631	1977	N/A
144	08321085	AP	Santa Barbara	Recruit Fee	202-25	ERG Operating Company LLC.	25	9N	33W	SB	34.82689	-120.30815	1977	N/A
145	08321086	AB	Santa Barbara	Recruit Fee	302-25	ERG Operating Company LLC.	25	9N	33W	SB	34.832157	-120.30656	1977	N/A
146	08321088	AB	Santa Barbara	G.W.P.	13-13	ERG Operating Company LLC.	13	9N	33W	SB	34.860131	-120.3115	1977	1995
147	08321090	AP	Santa Barbara	G.W.P.	304-24	ERG Operating Company LLC.	24	9N	33W	SB	34.843911	-120.30623	1977	N/A
148	08321091	AP	Santa Barbara	Recruit Fee	24-25	ERG Operating Company LLC.	25	9N	33W	SB	34.829955	-120.30948	1977	N/A
149	08321092	AP	Santa Barbara	Williams Holding	15-25	ERG Operating Company LLC.	25	9N	33W	SB	34.827589	-120.31168	1977	N/A
150	08321093	AP	Santa Barbara	Williams Holding	47-25	ERG Operating Company LLC.	25	9N	33W	SB	34.823604	-120.30488	1977	N/A
151	08321095	AP	Santa Barbara	Williams B	17	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.81265	-120.28097	1977	N/A
152	08321099	AP	Santa Barbara	G.W.P.	303-24	ERG Operating Company LLC.	24	9N	33W	SB	34.84391	-120.30629	1977	N/A
153	08321101	AP	Santa Barbara	Williams Holding	5	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.814059	-120.28262	1977	N/A
154	08321128	AB	Santa Barbara	G.W.P.	503-24	ERG Operating Company LLC.	24	9N	33W	SB	34.844121	-120.3002	1977	2003
155	08321131	AP	Santa Barbara	Conoco	1-31	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.808983	-120.27889	1977	N/A
156	08321134	AB	Santa Barbara	Fugler	107-30	ERG Operating Company LLC.	30	9N	32W	SB	34.822142	-120.29295	1977	2003
157	08321135	AP	Santa Barbara	Williams Holding	307-25	ERG Operating Company LLC.	25	9N	33W	SB	34.823878	-120.30748	1977	N/A
158	08321143	AB	Santa Barbara	WH-RF	404-25	ERG Operating Company LLC.	25	9N	33W	SB	34.828463	-120.30504	1977	2009
159	08321145	AP	Santa Barbara	Recruit Fee	303-25	ERG Operating Company LLC.	25	9N	33W	SB	34.830858	-120.30682	1977	N/A
160	08321147	AB	Santa Barbara	G.W.P.	301-24	ERG Operating Company LLC.	24	9N	33W	SB	34.848438	-120.30615	1977	2009
161	08321150	AB	Santa Barbara	Fugler	17-30	ERG Operating Company LLC.	30	9N	32W	SB	34.823036	-120.2941	1977	2003
162	08321151	AP	Santa Barbara	Williams Fee	81-36	ERG Operating Company LLC.	36	9N	33W	SB	34.82043	-120.29646	1977	N/A
163	08321154	AP	Santa Barbara	G.W.P.	502-24	ERG Operating Company LLC.	24	9N	33W	SB	34.84675	-120.30235	1977	N/A
164	08321158	AB	Santa Barbara	G.W.P.	401-24	ERG Operating Company LLC.	24	9N	33W	SB	34.848495	-120.304	1977	2009
165	08321160	AB	Santa Barbara	G.W.P.	203-25	ERG Operating Company LLC.	25	9N	33W	SB	34.829431	-120.30946	1977	N/A
166	08321161	AP	Santa Barbara	Recruit Fee	604-24	ERG Operating Company LLC.	24	9N	33W	SB	34.843725	-120.30027	1977	N/A
167	08321163	AP	Santa Barbara	G.W.P.	605-24	ERG Operating Company LLC.	24	9N	33W	SB	34.841049	-120.29826	1977	N/A
168	08321164	AP	Santa Barbara	G.W.P.	504-25	ERG Operating Company LLC.	25	9N	33W	SB	34.828153	-120.3012	1978	2003
169	08321183	AB	Santa Barbara	Williams Holding	11355	Union Oil Co. of Calif.	31	9N	32W	SB	34.80749	-120.27879	1978	2003
170	08321184	AB	Santa Barbara	Conoco	975-24	ERG Operating Company LLC.	24	9N	33W	SB	34.841186	-120.29815	1979	2009
171	08321202	AB	Santa Barbara	G.W.P.	57-25	ERG Operating Company LLC.	25	9N	33W	SB	34.823822	-120.30342	1979	1999
172	08321220	AB	Santa Barbara	Williams Holding	106-30	ERG Operating Company LLC.	30	9N	32W	SB	34.824836	-120.293	1979	2003
173	08321231	AB	Santa Barbara	Fugler	76-24	ERG Operating Company LLC.	24	9N	33W	SB	34.841159	-120.29833	1979	N/A
174	08321234	AP	Santa Barbara	G.W.P.	22-25	ERG Operating Company LLC.	25	9N	33W	SB	34.833624	-120.31028	1979	N/A
175	08321235	AP	Santa Barbara	Recruit Fee	806	ERG Operating Company LLC.	25	9N	33W	SB	34.823989	-120.29533	1979	2002
176	08321236	AB	Santa Barbara	WH-F	807	ERG Operating Company LLC.	25	9N	33W	SB	34.82386	-120.29532	1979	2002
177	08321237	AB	Santa Barbara	WH-F	833-25	ERG Operating Company LLC.	25	9N	33W	SB	34.831216	-120.30508	1979	N/A
178	08321240	AP	Santa Barbara	Recruit Fee		ERG Operating Company LLC.		9N	33W	SB				

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	API Number	Well Symbol	County Name	Lease Name	Well Number	Operator Name	Section	Township	Range	Base Meridian	Lat83	Long83	Year Drilled	Year Abandoned
179	08321243	AB	Santa Barbara	Williams Holding	853-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831317	-120.30248	1980	N/A
180	08321257	AB	Santa Barbara	Williams Holding	TO-1-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826813	-120.30886	1979	2005
181	08321298	AP	Santa Barbara	Williams Holding	3	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.81649	-120.28428	1979	1998
182	08321301	AB	Santa Barbara	Williams Holding	TO-2-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826464	-120.30928	1979	N/A
183	08321302	AB	Santa Barbara	Williams Holding	TO-3-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826617	-120.30836	1979	N/A
184	08321303	AB	Santa Barbara	Williams Holding	TO-4-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826846	-120.30962	1979	2005
185	08321324	AP	Santa Barbara	G.W.P.	503A-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.845453	-120.3002	1979	N/A
186	08321330	AB	Santa Barbara	McNee	15	Aera Energy LLC	20	9N	32W	SB	34.835782	-120.27475	1980	2001
187	08321347	AB	Santa Barbara	Fleisher	M2B	Aera Energy LLC	30	9N	32W	SB	34.834419	-120.28256	1980	2002
188	08321350	AB	Santa Barbara	Fugler	818-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.822053	-120.29296	1979	2003
189	08321351	AB	Santa Barbara	Fugler	927-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.823039	-120.2919	1979	2003
190	08321355	AB	Santa Barbara	G.W.P.	275-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.841054	-120.29801	1979	2009
191	08321357	AP	Santa Barbara	Recruit Fee	822-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.83269	-120.3081	1979	N/A
192	08321358	AP	Santa Barbara	Recruit Fee	942-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831917	-120.30445	1979	N/A
193	08321361	AP	Santa Barbara	WH-RF	843-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831111	-120.30322	1979	N/A
194	08321364	AB	Santa Barbara	Williams Holding	275-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827104	-120.29738	1979	N/A
195	08321370	AB	Santa Barbara	Williams Holding	952-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.832035	-120.30315	1979	2004
196	08321389	AB	Santa Barbara	McNee	16	Aera Energy LLC	20	9N	32W	SB	34.837035	-120.27666	1980	2001
197	08321393	AB	Santa Barbara	Fleisher	P4B	Aera Energy LLC	30	9N	32W	SB	34.832659	-120.28018	1980	2001
198	08321412	AP	Santa Barbara	Williams Holding	6	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.817461	-120.28621	1980	2000
199	08321488	AB	Santa Barbara	Fugler	117-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.824263	-120.29421	1981	2000
200	08321494	AP	Santa Barbara	Recruit Fee	932-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.832195	-120.30655	1981	N/A
201	08321495	AP	Santa Barbara	Recruit Fee	933-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.829375	-120.30741	1981	N/A
202	08321496	AP	Santa Barbara	Recruit Fee	943-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831169	-120.30499	1987	N/A
203	08321497	AB	Santa Barbara	Williams Holding	155-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.829204	-120.3032	1981	1982
204	08321501	AB	Santa Barbara	Williams Holding	853A-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831023	-120.30239	1981	2003
205	08321545	AB	Santa Barbara	Fugler	817-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.823759	-120.29323	1981	2000
206	08321546	AB	Santa Barbara	Fugler	917-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.823089	-120.29405	1981	2003
207	08321547	AB	Santa Barbara	Fugler	926-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.824849	-120.29189	1981	2003
208	08321553	AP	Santa Barbara	G.W.P.	964-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.843682	-120.30026	1981	N/A
209	08321557	AP	Santa Barbara	Recruit Fee	823-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831191	-120.30951	1981	N/A
210	08321558	AP	Santa Barbara	Recruit Fee	824-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.829349	-120.30951	1981	N/A
211	08321559	AP	Santa Barbara	Recruit Fee	834-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828759	-120.306	1981	N/A
212	08321560	AP	Santa Barbara	Recruit Fee	921-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.833635	-120.31047	1981	N/A
213	08321561	AP	Santa Barbara	Williams Holding	816-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825768	-120.31058	1981	N/A
214	08321562	AP	Santa Barbara	Williams Holding	827-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824072	-120.30763	1981	N/A
215	08321563	AP	Santa Barbara	Williams Holding	835-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828497	-120.30616	1981	N/A
216	08321568	AP	Santa Barbara	Williams Holding	926-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824934	-120.3107	1981	N/A
217	08321569	AB	Santa Barbara	Williams Holding	953-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.830365	-120.30273	1981	2003
218	08321572	AP	Santa Barbara	WH-RF	934-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828759	-120.30606	1981	N/A
219	08321618	AP	Santa Barbara	Williams Holding	7	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.815275	-120.28552	1981	N/A
220	08321636	AP	Santa Barbara	G.W.P.	834-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.843913	-120.30617	1981	N/A
221	08321638	AP	Santa Barbara	G.W.P.	943-24	ERG Operating Company L.L.C.	24	9N	33W	SB	34.845733	-120.30524	1981	N/A
222	08321644	AP	Santa Barbara	Williams Holding	916-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823728	-120.31211	1981	N/A
223	08321645	AP	Santa Barbara	Williams Holding	927-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823017	-120.31018	1981	N/A
224	08321649	AB	Santa Barbara	G.W.P.	WD3-13	ERG Operating Company L.L.C.	13	9N	33W	SB	34.863197	-120.30207	1981	2001
225	08321692	AB	Santa Barbara	Field Fee	63	Aera Energy LLC	32	9N	32W	SB	34.818717	-120.2759	1981	2001
226	08321693	AB	Santa Barbara	Field Fee	74	Aera Energy LLC	32	9N	32W	SB	34.817804	-120.27481	1982	2001
227	08321707	AB	Santa Barbara	Fugler	127-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.824821	-120.29194	1982	2003
228	08321708	AP	Santa Barbara	Recruit Fee	144-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.829371	-120.30511	1982	N/A
229	08321733	AB	Santa Barbara	G.W.P.	WD4-13	ERG Operating Company L.L.C.	13	9N	33W	SB	34.858322	-120.3005	1982	2001
230	08321785	AB	Santa Barbara	Bradley	3	Vintage Production California LLC	23	9N	33W	SB	34.846482	-120.32079	1983	2010
231	08321799	AB	Santa Barbara	Fugler	118-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.822589	-120.29411	1983	2003
232	08321800	AB	Santa Barbara	Williams Holding	154-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.830062	-120.30273	1983	N/A
233	08321805	AB	Santa Barbara	Williams Holding	165-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828033	-120.29973	1983	1999
234	08321808	AP	Santa Barbara	Williams Holding	175-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828034	-120.29849	1983	N/A
235	08321809	AP	Santa Barbara	Williams Holding	177-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823955	-120.29866	1983	N/A
236	08321815	AB	Santa Barbara	G.W.P.	41632	ERG Operating Company L.L.C.	24	9N	33W	SB	34.84829	-120.31247	1983	2009
237	08321818	AB	Santa Barbara	Gwinn Fee	132-31	ERG Operating Company L.L.C.	31	9N	32W	SB	34.819639	-120.28968	1983	2003

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	API Number	Well Symbol	County Name	Lease Name	Well Number	Operator Name	Section	Township	Range	Base Meridian	Lat83	Long83	Year Drilled	Year Abandoned
238	08321840	AP	Santa Barbara	Williams Holding	155A-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827741	-120.30364	1983	N/A
239	08321846	AP	Santa Barbara	Williams Holding	176-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826668	-120.29863	1983	N/A
240	08321852	AB	Santa Barbara	Bradley	4	Vintage Production California LLC	23	9N	33W	SB	34.845681	-120.3199	1983	2010
241	08321870	AP	Santa Barbara	Williams Holding	157-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823985	-120.30305	1983	N/A
242	08321871	AP	Santa Barbara	Williams Fee	181-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.82047	-120.29644	1983	N/A
243	08321886	AP	Santa Barbara	Williams Holding	10	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.819429	-120.2847	1983	N/A
244	08321907	AB	Santa Barbara	Los Alamos	211	ERG Operating Company L.L.C.	31	9N	32W	SB	34.808737	-120.2891	1984	2001
245	08321908	AB	Santa Barbara	Los Alamos	212	ERG Operating Company L.L.C.	31	9N	32W	SB	34.808487	-120.28681	1984	2001
246	08321910	AP	Santa Barbara	Los Alamos	244	ERG Operating Company L.L.C.	6	8N	32W	SB	34.820205	-120.28619	1984	N/A
247	08321911	AP	Santa Barbara	Williams Fee	182-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.818866	-120.2975	1984	N/A
248	08321912	AP	Santa Barbara	Williams Holding	147-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823645	-120.30487	1984	N/A
249	08321913	AP	Santa Barbara	Williams Holding	156-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825644	-120.30296	1984	N/A
250	08321914	AP	Santa Barbara	Williams Holding	167-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824405	-120.3007	1984	N/A
251	08321915	AP	Santa Barbara	Williams Holding	168-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822594	-120.30069	1984	N/A
252	08321918	AP	Santa Barbara	Williams Holding	354-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828892	-120.30193	1984	N/A
253	08321959	AP	Santa Barbara	G.W.P.	82-23	ERG Operating Company L.L.C.	24	9N	33W	SB	34.848217	-120.31263	1984	N/A
254	08321961	AP	Santa Barbara	Williams Fee	161-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.820725	-120.29957	1984	N/A
255	08321962	AP	Santa Barbara	Williams Fee	171-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.820888	-120.29952	1984	N/A
256	08321963	AP	Santa Barbara	Williams Fee	172-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.818882	-120.29771	1984	N/A
257	08321964	AP	Santa Barbara	Williams Fee	173-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.817269	-120.2986	1984	N/A
258	08321967	AP	Santa Barbara	Williams Holding	145-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827568	-120.30502	1984	N/A
259	08321968	AP	Santa Barbara	Williams Holding	158-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822264	-120.30287	1984	N/A
260	08321969	AP	Santa Barbara	Williams Holding	166-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826182	-120.30015	1984	N/A
261	08321970	AP	Santa Barbara	Williams Holding	178-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822676	-120.29804	1984	N/A
262	08321971	AP	Santa Barbara	Williams Holding	187-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823931	-120.29535	1985	N/A
263	08321972	AP	Santa Barbara	Williams Holding	188-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.821931	-120.29666	1985	N/A
264	08322008	DH	Santa Barbara	Bonetti	20AM	Shell Western E & P Inc.	19	9N	32W	SB	34.837769	-120.28705	1985	1985
265	08322026	AP	Santa Barbara	Williams Holding	153-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.831377	-120.30326	1985	N/A
266	08322028	AP	Santa Barbara	Williams Holding	355-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827404	-120.30162	1985	N/A
267	08322033	AB	Santa Barbara	Williams Holding	365-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.826888	-120.29915	1985	2003
268	08322038	AB	Santa Barbara	Victory	WD 1	Aera Energy LLC	29	9N	32W	SB	34.827342	-120.2718	1985	2003
269	08322056	AP	Santa Barbara	Fullerton	109	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.817	-120.28835	1985	N/A
270	08322062	AB	Santa Barbara	Bonetti	20AM-R	Aera Energy LLC	19	9N	32W	SB	34.83806	-120.28702	1985	2001
271	08322063	AB	Santa Barbara	Fugler	128-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.823006	-120.29194	1985	2003
272	08322068	AP	Santa Barbara	Williams Holding	356-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825627	-120.30291	1985	N/A
273	08322069	AP	Santa Barbara	Williams Holding	366-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825578	-120.2993	1985	N/A
274	08322070	AP	Santa Barbara	Williams Holding	376-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.82532	-120.29741	1985	N/A
275	08322086	AP	Santa Barbara	Williams Holding	255-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827411	-120.30131	1986	N/A
276	08322087	AP	Santa Barbara	Williams Holding	266-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825524	-120.29934	1985	N/A
277	08322088	AP	Santa Barbara	Williams Holding	276-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825063	-120.2963	1985	N/A
278	08322117	AP	Santa Barbara	Williams Holding	357-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823899	-120.30315	1987	N/A
279	08322118	AP	Santa Barbara	Williams Holding	367-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.824009	-120.29876	1987	N/A
280	08322120	AP	Santa Barbara	Williams Holding	377-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.822722	-120.29799	1987	N/A
281	08322121	AP	Santa Barbara	Williams Holding	378-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.821867	-120.29648	1987	N/A
282	08322122	AP	Santa Barbara	Williams Holding	368-25	ERG Operating Company L.L.C.	36	9N	33W	SB	34.821029	-120.29949	1987	N/A
283	08322123	AP	Santa Barbara	WH-F	386	ERG Operating Company L.L.C.	25	9N	33W	SB	34.825153	-120.29634	1987	N/A
284	08322124	AB	Santa Barbara	WH-F	387	ERG Operating Company L.L.C.	25	9N	33W	SB	34.823795	-120.29532	1987	2002
285	08322127	AP	Santa Barbara	WH-RF	342-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.832096	-120.30442	1987	N/A
286	08322128	AP	Santa Barbara	WH-RF	343-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.830067	-120.30404	1987	N/A
287	08322129	AP	Santa Barbara	WH-RF	344-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.828525	-120.30503	1987	N/A
288	08322130	AP	Santa Barbara	Williams Holding	345-25	ERG Operating Company L.L.C.	25	9N	33W	SB	34.827776	-120.30359	1987	N/A
289	08322181	AB	Santa Barbara	Gwinn Fee	321-31	ERG Operating Company L.L.C.	31	9N	32W	SB	34.820028	-120.29073	1989	2005
290	08322193	AP	Santa Barbara	WH-F	388	ERG Operating Company L.L.C.	25	9N	33W	SB	34.821554	-120.29556	1989	N/A
291	08322194	AB	Santa Barbara	Williams Fee	371-36	ERG Operating Company L.L.C.	36	9N	33W	SB	34.820512	-120.29643	1989	N/A
292	08322201	AB	Santa Barbara	Drumm	121	ERG Operating Company L.L.C.	31	9N	32W	SB	34.820712	-120.29204	1989	2001
293	08322203	AB	Santa Barbara	Fugler	318-30	ERG Operating Company L.L.C.	30	9N	32W	SB	34.821997	-120.29296	1990	2003
294	08322256	AI	Santa Barbara	Fullerton	200H	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.817116	-120.28863	1997	N/A
295	08322257	AP	Santa Barbara	Fullerton	201H	Greka Oil & Gas, Inc.	31	9N	32W	SB	34.817297	-120.28854	1997	N/A

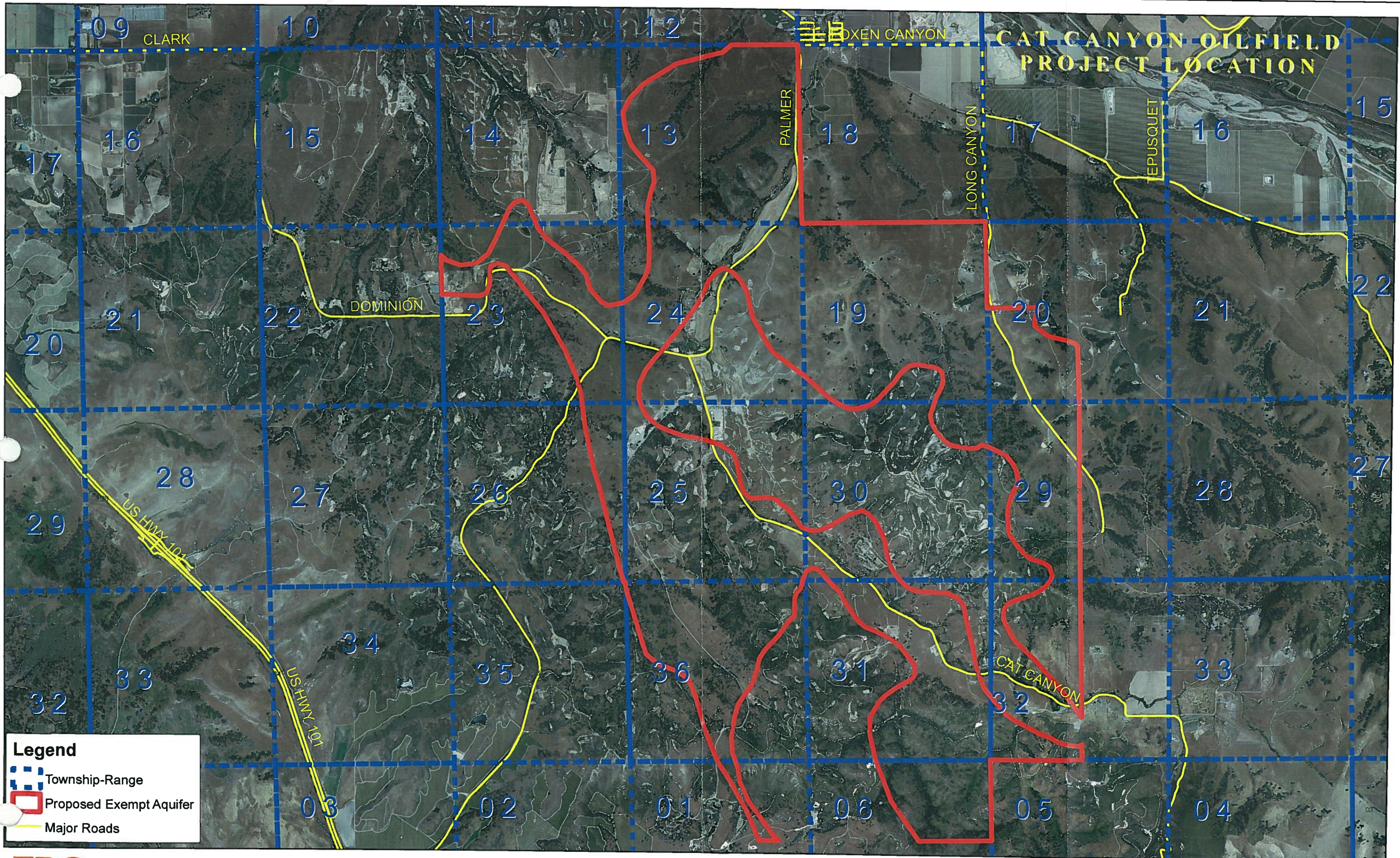


Exhibit 19
Zoning Map



Exhibit 20

GIS Map



ERG

ERG OPERATING COMPANY, LLC
CAT CANYON OILFIELD
SANTA BARBARA COUNTY, CALIFORNIA
JUNE 19, 2013

ERG OPERATING COMPANY
CAT CANYON OILFIELD